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Jeannin  
Stahl  
Taube 1914

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# YOU CAN BE A CHAMPION TOO...

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Bill Muncey, Owner/Driver of the 1976 National Champion Atlas Van Lines U-76.



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**dumas**  
boats



Bill Muncey and Jay Brandon talking about the new scale model of the Atlas Van Lines U-76.

Dumas Products, Inc., 902 East 17th Street, Tucson, Arizona 85719



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### To Tow a Glider

Click. The towline is attached, canopy locked, wingman ready and I nervously signal all is ready. 200 feet ahead the Super Cub pours on 150 horses and the glider starts to move. Off the skid, faster and the glider is airborne. I try to hold it two feet high and wait for the towplane to lift. It establishes a climb angle and I lock on. Just above and squarely behind! One foot right or left, up or down and the instructor behind me will eat my head. It's a dicey business towing a glider and five minutes of intense concentration will put us at 3,000 feet. Too high, too wide, too low and you can dork the towplane. For this reason you really watch it, corrections anticipated, movement by degree. Out of position and the tow pilot must jetison you and the line, but we make it, at 3,000 we cut free, a climbing turn to the right while the towplane dives away on the left. Now senses tune for thermals.

So why not with your models? You'll need a Powerhouse-like aircraft, some power to spare. (A Super Cub flies on 90 horse, 150 to tow a glider. Figure 90 available for the Cub, 10 for the line and drag, 50 to power the glider. Go up an engine size to haul a 100 incher.) Both ships should be well trimmed. Try to tow off the C.G. position of the tow ship, with tailwheel removed to prevent fouling a line. A servo release on both aircraft so that either can drop the line when things get too spicy. On the glider, tow point should be off the forward nose. Nosey trim for the climb.

The field? A long, smooth takeoff area. Towplane should takeoff, the glider too if wheel equipped, or it can be smoothly hand launched in a low path. Both flyers should walk near each other, coordinate turns. Your best chance for altitude is on the takeoff climb-out where you can see relative position best, it's harder on crosswind legs, so fly into the wind as far as you dare before a gentle turn together. Keep the towship throttled down, the glider in it's position. Somehow you'll probably make it, but for safety sake, off an empty field! Save the crowds for another day.

Try it, you'll like it! You'll find out what three dimensional flying is all about. •

*Don*

FLYING MODELS

# fly<sup>ing</sup> models

including  
FLYING  
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est.  
1927



FEBRUARY 1978

VOLUME 81 NUMBER II

NUMBER 488

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**FRONT COVER:** A pair in a portrait. Not one, but two Jeannin Stahl Taubes, Kathy McDaniels' rubber version and W.R. Stroman's CO<sub>2</sub> powered replica of this 1914 machine. John Williamson's photographic skills catch both looking at each other in this still life of days gone by. Scale buffs will be happy to know both versions fly with a silent grace worthy of the effort.

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## Flying Report

news and comment



Hanno Prettner of Austria is shown here receiving his \$13,000 check from William G. Bennett of Circus-Circus Hotel and Casino and being congratulated by Walt Schroeder of Model Airplane News.

**L**AS VEGAS, Nev.—Hanno Prettner of Austria won first place Pattern honors and \$13,000 in the Fourth Annual Tournament of Champions radio control aerobatic aircraft competition, which ended today at R/C Model Airport in N. Las Vegas Regional Park. It is the 26-year old electrical engineer's fourth consecutive victory in this event.

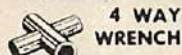
Flying his "Curare," the phenomenal young ace from Klagenfurt maintained his lead throughout four days of competition, defeating 21 champion-level pattern pilots from the United States and abroad. He accumulated 2,942 points, awarded by an international panel of judges.

Co-sponsored by Circus Circus Hotel/Casino, Las Vegas mid-Strip resort, and

Bob Nelitz of Canada is shown here accepting the Scale Division Championship trophy from William G. Bennet of Circus-Circus Hotel/Casino. Nelitz had won the American, Canadian and World trophies.



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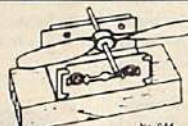
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QUALITY HOBBY ACCESSORIES SINCE 1937



Pattern	Points
1st Hanno Prettnr, Austria	2,942
2nd Wolfgang Matt, Liechtenstein	2,859
3rd Dave Brown, Cincinnati, Ohio	2,810
4th Gunter Hoppe, W. Germany	2,774
5th Ivan Kristensen, Canada	2,683
6th Bruno Giezendanner, Switzerland	924
7th Benito Bertolani, Italy	902
8th Mark Radcliff, Newport, Ohio	901
9th Steve Helms, Pensacola, Fla.	898
10th Tony Bonetti, Emerson, N.J.	894
11th Jeff Tracy, Australia	894
12th Giichi Naruke, Japan	889
13th Tetsuji Okumura, Japan	879
14th Phil Kraft, Vista, Cal.	861
15th Dean Koger, Wright-Patterson AFB, Ohio	857
16th Denis Donohue, Bergenfield, N.J.	847
17th Bill Salkowski, Canoga Park, Cal.	836
18th Fred Kugel, Celina, Ohio	829
19th Ron Chidgey, Pensacola, Fla.	807
20th John Brink, S. Africa	762
21st Luis Castaneda, Mexico	672
22nd Terry Cooper, England	342

Scale	
1st Robert Nelitz, Canada	DeHavilland Chipmunk
2nd Dave Platt, USA	Douglas SBD Dauntless
3rd Phil Moore, England	PZL Wilga
4th Claude McCullough, USA	Shinn 2150-A
5th Gerald Fingler, Canada	Shinn 2150-A
6th George Rose, USA	Curtiss P-6E Hawk
7th Stephen Sauger, USA	Fairchild 24
8th Robert Wischer, USA	Piel Beryl
9th Bruno Klupp, W. Germany	Zlin 42
10th Colin Jones, S. Africa	Ryan STA
11th John Roth, USA	Volkplane
12th Dennis Bryant, England	Bristol Bulldog
13th Andrew Sheber, USA	Pitts S2A
14th Granger Williams, USA	Curtiss F6C-4 Hawk
15th Bud Nosen, USA	P-47D Thunderbolt
16th Andrzej, Poland	Super Fli
17th Walt Moucha, USA	Curtiss JN4 Jenny
18th Glenn Buseman, USA	Fieseler Storch

Model Airplane News, the \$55,000 international invitational tourney is the richest event in the aero-modeling world.

Wolfgang Matt of Liechtenstein captured second place and \$5,000 with 2,859 points. From Cincinnati, Ohio, Dave Brown came in third to win 2,810 points and \$4,000. Gunter Hoppe of W. Germany ranked fourth with 2,774 points for \$3,000, and Canada's Ivan Kristensen won \$2,500 in fifth place with 2,683 points.

Crowds of modelers and press from around the world crowded the podium at R/C Model Airport as William G. Bennett, president of Circus Circus Hotel/Casino, and Walter L. Schroder, president and publisher of Model Airplane News, presented awards to the five finalists. In addition to the \$13,000 check, quadruple-champ Prettnr received a giant trophy.

Special demonstration flights by radio control and manned aircraft were presented during the competition. Today's highlights included an aerobatic flight by Steve Nelson in Super Fli, a full-size plane patterned from a model of the same name designed and built by Phil Kraft of Vista, Calif. Laughter swept the field as the Bakersfield Barnstormers Airshow Team recreated a "Snoopy and the Red Baron" chase sequence with R/C aircraft, and Dieter Schluter of W. Germany demonstrated a radio control helicopter.

Earlier in the week, Canadian Robert Nelitz took top honors in the Scale Division with his replica of a DeHavilland Chipmunk. 1977 marks the premiere of a Scale contest as part of Tournament of Champions in addition to the Pattern aerobatic match.

The combined events brought together 42 pilots from fourteen nations.

## Name change

Helmut Bernhardt Precision Movements

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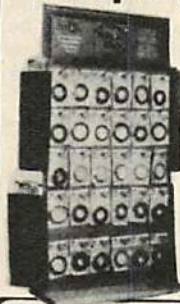


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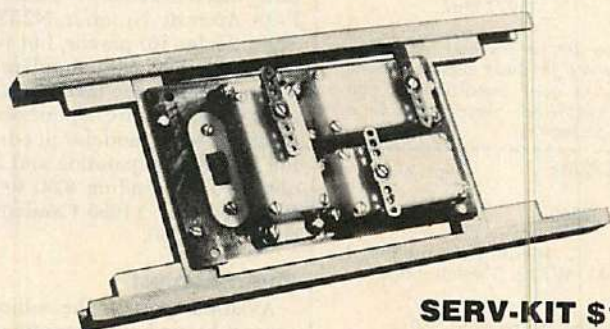
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Company, makers of industrial and laboratory instrument components, such as gauge movements, instruments pointers, potentiometer drives, gear trains, etc., as well as of engines for model airplanes, boats and cars, has changed its name to Bavarian Precision Products Company, effective January, 1978. The change is due to the expansion of the product line into items other than gauge movements and instrument components. There will be no other changes in the company's United States operation, which is located in New Canaan, Connecticut. "The 'HB' Trade Mark, and the 'HB-Engine' product name will still be used, our market will be the same, and we will continue to offer our customers the prompt service they are accustomed to," said Alexander A. Amarillos, general manager for the United States. For further information, contact Bavarian Precision Products Company, P.O. Box 6, New Canaan, CT. 06840. Phone: (203) 966-8781.

### Model Plan Services has new owner

Captain Dale Willoughby, former R/C Editor of Channel Chatter, recently purchased the plans, office equipment and the name Model Plan Service. He reports he has changed the name to Scale Model Plan Services and has added the line of Japanese Super Scale Production drawings published in Koku-fan (Aviation) magazine in Tokyo. These plans are drawn by K. Hashimoto, all are 15 x 20" and all have at least 3 views (some have 4 or 5 views) with cross sections and peculiar armament or modifications shown. These plans form the first step in Scale research. Captain Willoughby is also offering a complete scale package, consisting of the scale 3 views, plus 10 colored photos (20 for AMA Scale) of restored aircraft. His first three offerings are the Messerschmitt Bf 108 (not 109) German single seat trainer, the Hawker Sea Fury F.B. Mk II (Frank Saunderson's racer), and the P-51 D Mustang "Man of War" flown at the Reno Air Races. By the time this appears in print, the Consolidated - Vultee BT-15 in U.S. Army colors (restored) should be ready. These scale presentations are nominally priced at \$15.00 post paid, both for AMA Scale and for AMA SPORT SCALE. The Confederate Air Force P-38 Lightning in red, white and blue, raced at Reno, NV, is also ready. This P-38 Aircraft Number N25Y is only for Sport Scale (10) photos, but is easily made into AMA Scale by supplemental photos. These photos were taken by a model builder of over 40 years experience who knows what the scale modeler needs. A new catalog is under preparation and a copy can be obtained by sending \$.50 to Scale Model Plan Services, 14695 Candada Place, Tus-tin, CA., 92680.

### Photo contest

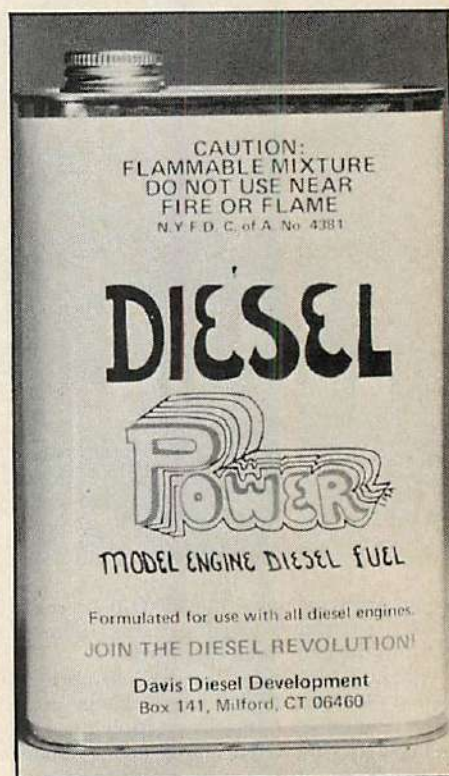
Aviation sports is the subject for a photo contest being held in conjunction with the Soaring Society of America national convention. The convention will be held in Washington, D.C. in February, and one of the highlights will be the exhibition of the winning photos.

The host club, Mid-Atlantic Soaring Association, is accepting entries which depict any sport aviation, such as soaring, ballooning, air races, hang gliding, model or experimental aircraft, sky-diving, etc. There are

separate divisions for color prints, monochrome prints, and slides. Judging will be done in late January by a panel of pilot photographers and photography experts.

Aviation enthusiasts who also take pictures are urged to enter their work. For further information and entry blanks write to the General Chairman, Mike Vore, 5492 Mystic Court, Columbia, Maryland 21044.

### Product notes



**DAVIS DIESEL DEVELOPMENT**, Box 141, Milford, Conn. 06460 announced the completion of its network of distribution of its model engine diesel fuel. For the first time in 20 years, high quality diesel fuel is available to the modeler through regular hobby shop outlets, throughout the U.S. Currently available in pints and quarts, Diesel Power is formulated to give consistently high levels of performance using a blend of organic and synthetic lubricants. For further information on the advantages and technique of diesel operation you may write directly to Davis Diesel Development. Suggested list price is pint \$3.50, quart \$5.00.

**COVERITE**, 2779 Philmont Ave., Huntingdon Valley, PA 19006, has introduced The Trimit, a new tool that cuts through Monokote, Solarfilm, Coverite, silk or tissue, as clean as a razorblade - but lasts far longer. The Trimit blade is multi-faceted like a diamond, which gives it superior sharpness and durability. Recent tests showed that the blade remained sharp after cutting over 300 feet of Coverite. In addition, the underside of this unique patented blade is curved so that material can be cut without leaving any scars on even the most fragile balsa or delicate work surfaces including foam. The blade is housed in a special T-square shaped head which runs smoothly along the edges of a model (or a





ruler) producing perfectly straight cuts. If a curved cut is required, the Trimit blade can change direction without tearing the material due to its flexible construction. The Trimit comes with a plastic cover so it can be carried safely in a pocket. Suggested retail price is \$1.19.

**MIDWEST PRODUCTS CO.,** 400 South Indiana St., Hobart, Indiana 46342, now offers you a plane kit that offers realistic jet flight performance when used with the Midwest Axiflo<sup>®</sup> RK-40 ducted fan kit. Designed by Nick Ziroli, and first published in *FLYING MODELS*, the Heinkel-162 is the perfect companion to Axiflo RK-40. Scaled after Germany's HE-162, the Heinkel gives you the flight performance you want. Kit consists of micro-cut balsa wood fuselage and empanage. Foam core wing and balsa covering material. Vacuum formed canopy, preformed landing gear and authentic decal sheet. This kit is not for the novice. If you like to build, you'll love the results! Truly a unique looking aircraft that you'll be proud of. The Heinkel is a very stable and easy to fly airplane. It weighs in at 7 lbs. with a .40 engine in an Axiflo RK-40 ducted fan.

**GRISH BROS.,** St. John., IN 46373. True helical pitch and airfoil are featured in Grish's new line of aircraft type propellers in hardwood. Engineering of these high air efficiency blades and woodworking equipment to produce them has been completed after several months. The initial production runs of all 8 of the new numbers have been well received by distributors, dealers and modelers as a supplement to

the extensive Grish line in polyester propellers in the 5" to 12" range. Each of the new propellers comes fully carved to true helical pitch ready for sanding. Sizes: 18", 20", 22" and 24". Each of the 4 sizes is available in 8 pitch or 10 pitch. All hubs have 3/8" bore. Retail prices in the range of \$7 to \$13. Finished propellers are in future plans only. For scale looks the big bird boys might wash out the tips on the larger sizes and still utilize reasonable h.p. engines or reduction units. This is the primary purpose for carved props only.

**MODEL RECTIFIER CORP.,** 2500 Woodbridge Ave., Edison, NJ 08817 has added standard and reverse ball bearing servos to their series of 8 different R/C servos. The ball bearing adds support and lessens friction between output gear and the servo case, providing for precision control and minimum play. Fast and tight, the MR70, which retails at \$49.95, is ideal for the advanced flier who wants optimum performance and will appreciate the added smoothness the ball bearings provide. The MR70 also makes an excellent servo for R/C cars because the ball bearing, which supports the output gear, will absorb and protect the servo from the vibration and rough handling normally associated with R/C car running. The MR70 minimizes deadband and gets its speed and power from a Signetics IC #544A. It also has one of the thickest lugs of any servo offered today. This heavy duty lug construction can help the servo survive the roughest of landings. A choice of five output accessories are supplied with each servo. These include



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	6.3	6.4 35¢
7.4	7.6	7.8 50¢
8.4	8.6	8.8 65¢
9.4	9.6	9.7
9.8	10.4	10.6 85¢
11.4	11.6	11.8 \$1
12.4	12.5	12.6 \$1.50

5 1/2 3	2 Blade Pusher	
5 1/4 4	6.3	6.4 35¢
		8.6 85¢
	9.6	10.6 \$1

5.3	3 Blade Tractor	
6.3	6.4	50¢
6.3	3 Blade Pusher	
6.3		50¢

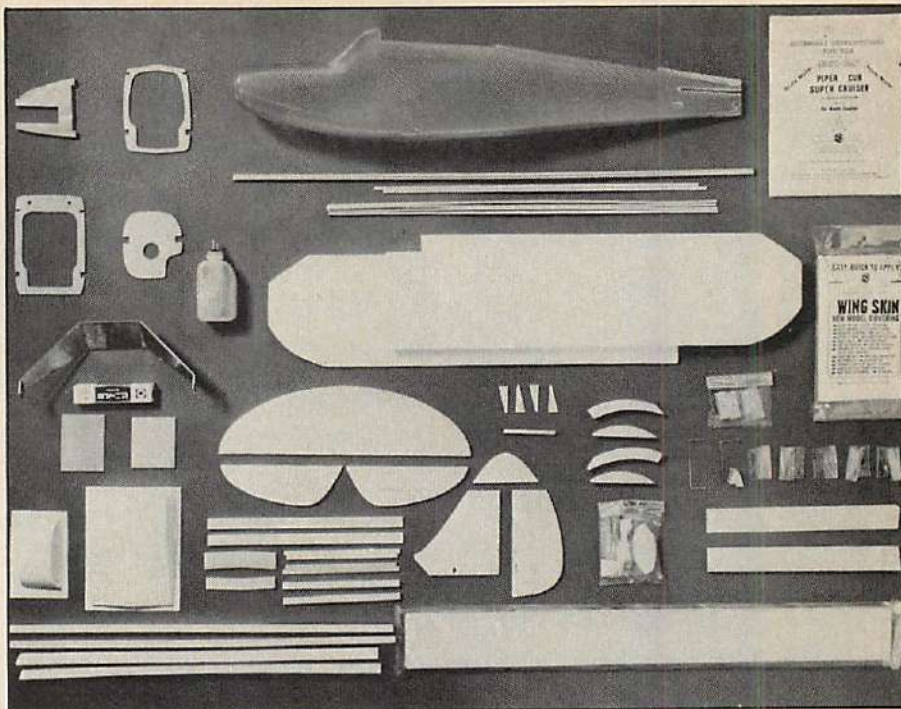
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Aluminum  
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Looks like metal.  
Color all the  
way thru.

3 Blade

**GRISH BROS.**  
ST. JOHN, INDIANA 46373



one triangular, one medium disc, one large disc and two different arms. The MR70 measures 1 3/4" x 7/8" x 1 1/2", and weighs in at 1.8 oz. Idle current is only 5 MA. Model Rectifier Corporation, Edison, N.J., also has ball bearing coreless motor servos, mini servos, heavy duty retract and hi-torque servos in its line.

ARISTO-CRAFT, 314 Fifth Ave., New York, NY 10001 has just released a Piper Kit designed for 3 or 4 channel radio control. It can use .15 or .25 gas engines and has a 51-inch wingspan. It's scaled 1 1/2 inches to the foot and is authentic 1/8 scale.

Kit contains: covering instructions and vinyl cement - die cut bulkheads - formed

engine cowl - gas tank - nuts, bolts, washers - metal landing gear - steel wheel bracket - Balsa sheets for wing planking - 24 page step-by-step instruction manual and full scale easy to follow plans by Walter Musciano. This revolutionary kit, with pre-fab, easy-to-assemble parts is a modeler's dream come true. Suggested list price - \$61.50.

PACTRA INDUSTRIES, INC. Los Angeles, Ca. introduces to the hobby field an amazing rapid bonding "space age" cyanoacrylate adhesive called Aero-Weld. Aero-Weld's exclusive aluminum tube, unlike a plastic tube, will preserve its strength indefinitely before opening. After opening a newly developed "Lok-Tight" cap is pro-







vided to keep Aero-Weld fresh longer. An adjustable 2" fine point applicator is furnished for getting into tight places. Aero-Weld is a colorless, transparent liquid with the viscosity of water. Ready and easy to use right out of the tube, and requires no long waiting period, mixing or clamping. Ideally suitable for gas powered models where strength is essential, and for that on-the-spot field repairs. Also a pretty handy item for around the home repairs. Works well on materials like balsawood, plastic, metal, nylon, glass, leather, ceramics, rubber, porcelain, etc. Aero-Weld is available in 15 Gram, 7 Gram and 2 Gram sizes. All are on pilfer-proof bubble cards, including complete instructions for use on back of card.

**TOP FLITE MODELS, INC.** 1901 North Narragansett Avenue, Chicago, Illinois 60639, has introduced EconoKote, a new economical low-heat covering for use on foam surfaces, solid areas and strong open-frame structures.

EconoKote is light, weighing only one-fifth ounce per square foot, and it's so pliable that it can be easily applied around compound curves. While weighing less than regular covering and finishing materials such as paint or dope, EconoKote still has tensile strength of 25,000 P.S.I., making it ideal where extra strength isn't required.

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looking finish while eliminating the usual tedious work involved in sealing, doping, sanding and polishing. A six-foot roll of EconoKote costs \$6.95 (suggested list price). EconoKote is available in six ultra-high gloss colors.

**CHAMPION MODEL AEROPLANE CO.,** P.O. Box 45, Keyport, NJ 07735, announced their new Anderson Amphibious Kingfisher. It is a 72" span standoff scale ship for .60 to .80 engines and weighs in at

6½ to 7½ pounds. The kit features all-balsa construction with a hardware package and die-cut ribs. The wire parts are all pre-formed and the cowl, nacelle and wing tip floats are made of ABS plastic. List price is \$119.95.

**VORTAC MFG. CO.,** P.O. Box 469, Oak Lawn, IL 60453 has a new bomb and drop tank Release Mechanism that will be of interest to all R/C flyers, particularly to those flying scale and sport scale military

airplanes. The Release Mechanism consists of a pod, two and one half inches by three eighths inches, that is spring loaded and attached to the aircraft with the two sheet metal screws that are included. It can be connected to a servo by pushrod or pull cord. Also included is a release clip which can be epoxied to a bomb or drop tank. The unit is small enough to be mounted anywhere on the aircraft's surface or in a scale ordnance pylon. One of the nicest features of this unit is that the bomb or drop tank can

What's a

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Elevator and Rudder are sheet, Stab & Fin is built up and sheet covered to keep it flat . . . so that's it, a fine kit of a fine ship.

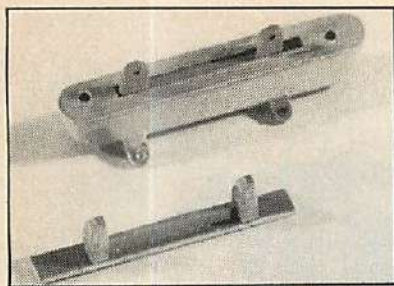
Why it's a big beautiful 68"

# Super FLEET



**\$63.95**





be simply clipped onto the release mechanism without the aid of tools or a transmitter. Both parts are made of gray nylon. The unit retails at \$4.98 and will be available by January 1, 1978. Extra release clips will be sold separately at two for .98¢.

ACE R/C, INC., Box 511H, Higginsville, MO 64037 has announced their first new kit offering for the 1978 season, "Alpha" by name, designed by Tom Runge. The aircraft is 40" in span, for engines in the .049 to .09 displacement range and flies with two or three channel R/C equipment. Ace considers it a small sized Trainer and Sport type airplane., offering attractive lines and a degree of realism, yet quick to build and structurally rugged enough to take on the practice sessions. Lite plywood fuselage construction is featured together with a double-sparred flat-bottomed foam type wing. It reportedly flies well in a stable way with good slow-speed and gliding flight

# FLY ELECTRIC

- VL-101 Electric propulsion system shown—using Hytork 48 motor and planetary gear box, SI-3 switch & charging jack, and B-33L fast charge ni-cad flight battery—total weight 2½ oz.—will power models 25 to 50" wingspan weighing up to 10 oz.
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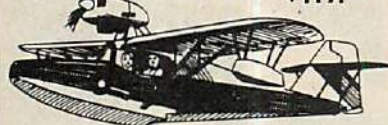
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ANDERSON

# KINGFISHER

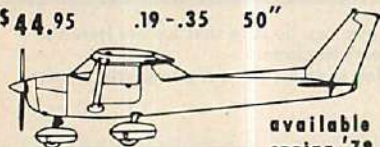
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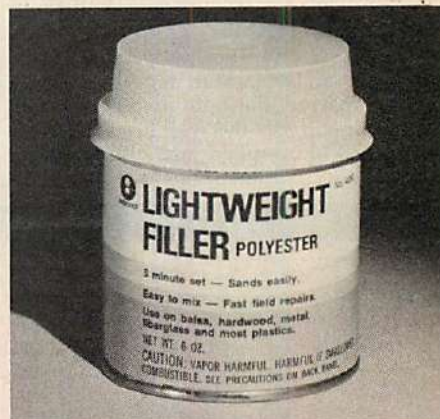
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characteristics. Wheel pants are not included in the kit as offered. Ace's Alpha kit is numbered 50L212 and the price is \$19.95. All up flying weight is approximately 25 ounces and complete hardware is provided.

CRAFT-AIR, 7851 Alabama Ave., Canoga Park, CA 91304, has introduced a new field box that is ready to use and made of hi-density, UV stabilized polyethylene. The box holds a motorcycle battery or a gell cell and a gallon can of fuel securely as well as your transmitter and electric starter. It features a 12½ x 6¾ x 2" drawer and a removable 4 x 7 x 4" ditty well in the top. There is sufficient for mounting a power panel. The suggested retail price is \$29.95.

WORLD ENGINES INC., 8960 Rossash Ave., Cincinnati, OH 45236, has announced their new Super Tigre .60 schnuerle engine which will be available as a rear or side exhaust. Initial tests show this engine to be very competitive with any of the .60 schnuerle engines available today. They also showed their special O.S. motor mount designed strictly for the O.S. .60, 4-cycle engines and a heat sink for the O.S. .25 FSR.



FIBRE GLASS-EVERCOAT COMPANY, INC., 6600 Cornell Rd., Cincinnati, OH 45242 has introduced a Lightweight Filler, a new polyester product for on-the-spot repairs. Lightweight Filler will stick to almost anything, cures in minutes, sands very well, feathers easily, and is excellent for fillets. Available in six ounce cans with creme hardener, Lightweight Filler retails for about \$3.00.

## Air Mail

readers' forum

### Cessna cover

The December cover of FLYING MODELS with the Cessna 401A on it was great. Would love to see a kit of that fine ship.

TONY BOSZKA  
Yonkers, NY

### Heinkel

Reference the December 1977 issue of FLYING MODELS, it's Heinkel, not Heinkle.

E. NINO CAMPANA, D.C.  
Sault Ste. Marie, Ont.

### Suggestions

Thanks for a fine magazine to your whole team especially Bob Aberle. I wonder if he would study the idea of a ½A aircraft for a small field with slow flying characteristics and a Rogallo wing. It could be controlled with throttle and rudder. A great design for beginners and Sunday flyers. Thanks for your consideration.


J.P. LACROIX  
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54" Wingspan For 29 to 45 Engine

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72" Wingspan For 45 to 60 Engine

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66" Wingspan For 36 to 60 Engine

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### Ducted fans

I would like to know if there are any ducted fans on the market for models and if your magazine has published something along those lines.

**GIANCARLO MARCOZZI**  
Gorizia, Italy

### Wants a penpal

I am 16 years old and would like an American penpal of about the same age interested in model aircraft. I have been flying control line models for a few years and I am now a fanatic. I am sure that there is someone in the U.S.A. who is genuinely interested in control line stunt flying and eager to exchange ideas with an Australian modeler. Here in Australia we don't have any magazines as good as FLYING MODELS and I would like to thank you for keeping us up to date with American trends.

**JOE PARISI**  
21 Namatjira St.  
Everton Park  
Brisbane. 4053  
Australia

© In the January 1978 issue of FLYING MODELS, Bob Aberle wrote an FM Product Review on Midwest Product's new Axiflo ducted fans—Ed.

### Sandbagging

I am writing in reference to your November 1977 issue of FLYING MODELS, the With Model Builders column by Ed Whalley. I really have no experience or qualification to write regarding "sandbagging", never having been in a contest (I'm an R/C sport/Sunday flier) but it would seem simple to let a contestant's flying place him in a category not his mouth. Or perhaps at the CD's discretion, a flier may be upgraded, but not downgraded. Using your example, the Beginner with the 461 score would be upgraded to the Advanced category, but someone registered as Advanced could not be put in Beginner if he flew a 290.

**FRANKLIN A OILER**  
Newville,  
Penna.

## FM Clinic

tips from the staff

### Douglas A-20 Havoc

**H.A.:** I am interested in building a model of an A-20 from a 3-view and I am wondering what the interior arrangement was like, and as to the size of the crew?

The A-20 I believe carried a 3-man crew, pilot, navigator/bombardier and tail gunner/co-pilot. The pilot entered the aircraft by climbing vertically up via hand and retracting toe holds up behind the trailing edge, walked forward on the top of the fuselage and dropped straight down into his seat. He was isolated from all other crew members. To bail out I believe he would have to roll inverted first to prevent himself from being ingested into the props which passed about 6" from either side of the fuselage. The bombardier/navigator entered from the nose, but he too could not move elsewhere about the aircraft. Just forward of the vertical fin you would find the rear gunner, with field of fire interrupted by the tail surfaces. He could see sideways and rearwards, but not at all forward. That was too bad because he was the co-pilot, taking over if the pilot was out of action. A control wheel, basic instruments and not much else. Probably about enough to head home to friendly territory and then bail out. Unless he was truly experienced, and the field large, I imagine it would be nearly impossible for him to execute a landing. This is my opinion and not too factual, hopefully some brave fellow pulled it off in those war-torn years of long ago. The aircraft topped my personal list of ones I would rather watch than go into action on, but it did compile an impressive war record.

### Adhering Microfilm

**D.A.:** How is microfilm made, handled, glued on and trimmed off?

**ANSWER:** It's an art in itself. Microfilm in a liquid state resembles clear dope in appearance and odor, but is chemically of a different formula. A shallow tray of water is al-

lowed to calm itself, and a capful of microfilm is poured upon its surface, spreading in a film which resembles drops of oil upon water. It congeals into a thin film which shortly after may be picked up on a wood or wire frame placed beneath it. Getting it to part company with the surface tension of the water is your problem, no doubt you will turn the air blue until you get the hang of it.

Once dry, the shimmering film of microfilm (still on the frame) will cast all colors of the rainbow, giving a clue to its thickness. The framework to be covered is coated around the perimeter with good old mouth-watering saliva no less, an ideal cement for this purpose. Gently contact balsa to microfilm and it is on. But how to trim it? The sharpest razor will not do, but you can burn it off. A lit cigarette has one redeeming quality, it can melt away the microfilm. Pass the smoldering butt about a 1/4" away from the leading and trailing edge and as you do the microfilm will appear to evaporate right up to the still-damp balsa. Still another way is to dip a brush in thinner and pass it in like fashion near, but not touching the framework. This also is very effective and easy.

Which leaves you with wrinkles. Wait until it is on the dry side, then bring the covered framework not too near a lit light bulb. It will shrink with the heat not unlike our iron-on covering materials do in front of a heat gun. These would be too powerful though, blowing holes through the delicate microfilm. Take it slow and easy.

### Night Lights

**H.L.:** Is it practical to fly Control line models at night? What are the pitfalls and problems?

**ANSWER:** Assuming you are a reasonably experienced Control line flyer, it is relatively easy to fly a model you are familiar with at night. The problem however is not with the model, but with the surroundings. One small light in the canopy is all you really

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need, though a full set of navigation lights and landing lights will add icing to the cake. So much for the aircraft, let's discuss the safety aspects. A loud noise at night tends to attract the curious like a magnet and in the black of night you do not see spectators approaching. Nor do they understand what you are doing. I don't know what the answer to this is and I once gave up even trying to fly at night for just this reason. I had several ships equipped with a full set of lights and landing lights timed to stay on through the take-off and flash on again when the aircraft was running low on fuel. You will need either full spectator control around the perimeter of your flight circle, or a very rural location out with the cow pies somewhere. Consideration #2: Lights on the horizon. What you don't need much of at all is a lot of nearby lights, streetlights, houses, car headlights etc. to confuse the picture. If you've flown Contoline at all you know the aircraft is in sharp focus to the flyer and the horizon is just a whirling blur not to be considered much. Imagine it now full of streaks of lights, and your one lone bulb up there in the wind amid the confusion. Everybody loves to help, they turn on their headlights, they run and get a searchlight and then zap you in the eyes with it when all you need is the pitch blackest, darkest pastureland you can find. Just be careful where you step. Against the black of night your navigation lights will show a streak of red and green and white which you can follow with ease. The height of the control wires leaving the handle you can be felt with your left hand, your clue to start the flare-out. I have flown

quite a bit at night and have never even chipped a prop. It's not hard at all, but do try to avoid the lights of nearby civilization and again, find a safe place where spectators can't walk into the action. It's a real hazard in the dark, so please be careful for them.

### Dropping Off the Motor Stick

S.W.: Is it possible to get a lightweight tissue and stick kind of glider aloft to a good altitude without resorting to a towline?

ANSWER: Well a towline is the easiest, but not the only way. Try a rubber motor on a lightweight motor stick, the typical rubber prop, winding methods. The only difference is that the rubber tension of the wound-up motor springs the aft wire hook forward a bit, enough to engage the actual glider attached above it. When the model screws itself up a couple of hundred feet, the motor unwinds, the hook springs back to its unleaded position and the motor boom falls off, prop, rubber and all that kind of dead weight. That leaves you with the lightest of gliders, unencumbered with drag. No need even to build it too strong. You will have to observe the same C.G. locations, or close to it, perhaps a bit more nose heavy with the power boom attached, and old man Gravity will have to be thwarted a bit with a little silk parachute. If you get into this act, build a couple of gliders at a time, or rig a dethermalizer on them, the loss rate can be high as you end up with a really light machine a fair ways up.

### The Way to Plank

W.A.: Would you please explain how to plank a rounded fuselage? I have always

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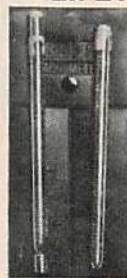
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admired such handiwork, but I don't think I know where to begin.

ANSWER: It is not hard, but it takes time. The finished result however is well worth it and it gives you a really beautiful fuselage. You will need medium soft balsa strips, say  $\frac{1}{8}$ " x  $\frac{3}{8}$ " (straight-grained) for a larger model, or perhaps  $\frac{3}{32}$ " x  $\frac{1}{4}$ " for smaller work. It is important to apply one strip at a time, first on one side, then the next on the opposite side, a strip along the top and another along the bottom. The idea is to start spacing the strips all around, rather than ten all in one place as the uneven pull of the bending balsa will tend to warp your fuselage accordingly.

You should have a good, sharp, well adjusted razor plane. As each strip is rectangular in cross-section, if so applied around an oval cross-section, gaps would appear spoiling the effect. Long smooth strokes of the razor plane will bevel down the edges of the planking strips so one can nestle against the other. In addition to beveling the edges as seen in the cross-section of the strip, it usually must be tapered fore and aft a little bit to roughly approximate the general shape of the fuselage as might be seen from the side and top view. Given a strip  $\frac{1}{8}$ " x  $\frac{3}{8}$ " x 36" to start with, you might decide on a taper of  $\frac{1}{4}$ " toward the nose,  $\frac{3}{16}$ " wide in the cabin area, shaving down to about  $\frac{3}{16}$ " wide toward the rear tail end. It sounds like an impossible project, but it is not. Usually two or three strokes of the razor plane will give you a close enough approximation. Test fit each strip for a smooth mating with the one next to it, already positioned. Use regular model aircraft cement at all times. You will have to sand down the newly planked fuselage later on and white glues drag somewhat in such a situation, while epoxies are too heavy, stronger than necessary and too hard to sand in this application. To sum it up, planking is extremely easy, but it takes plenty of time. Personally I look forward to it, the end result is like a well laid oak floor, beautiful strips flowing into one another around an oval streamlined fuselage. A medium grit production paper will take the rough edges and cement smears off, then finer grit papers will polish the job up until you can't see where one strip ends and the next begins. Strong too, a planked fuselage compares with anything you can build in the balsa line. Don't try to do a whole fuselage at once. Plan on an hour or so at a time, over three or four days perhaps. You are out to create a masterpiece here, not a slab-sided box. Try it, you'll like it, it will be the model you remember best in your old age.

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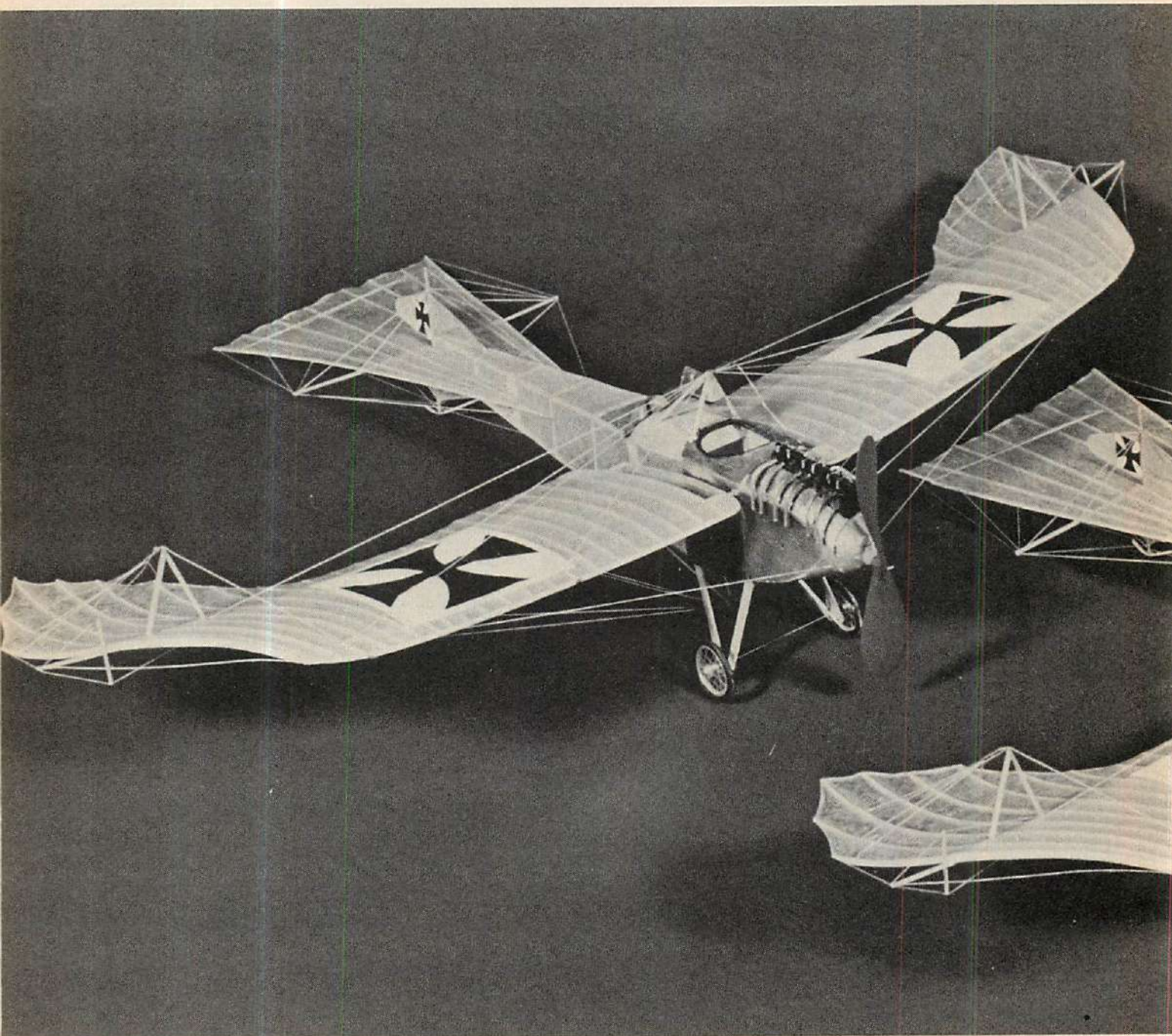
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Two Taubes for the price of one, take your choice between CO<sub>2</sub> or rubber power for this little gem of a Free Flight model, it'll fly equally as well with either one or build them both and double your flying enjoyment/**Bill Stroman**

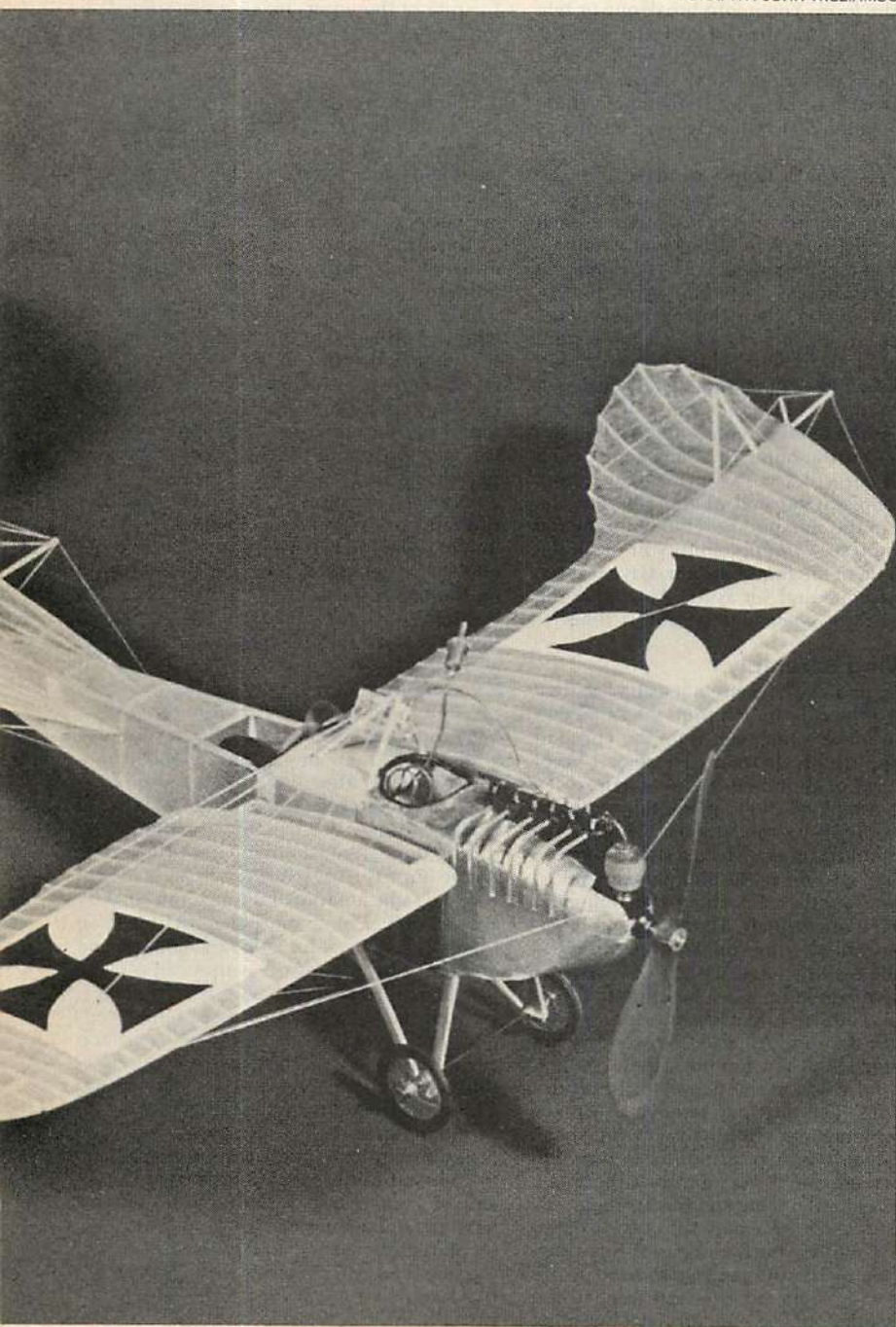
# Jeannin Stahl





# Taube - 1914

PHOTOGRAPHY: JOHN WILLIAMSON



**T**wo Taubes for the price of one! This time you get a choice of the mode of power for your Free-Flight model. Before you panic as to how long it would take to build this, let me say that both models were built together in three weeks time. They both seem to fly very well and should need little in the way of trimming.

The full sized Jeannin Taube was unusual in many ways from the run of the mill Taube. First, the fuselage was made of steel tubing, earning the name "stahltaube" or steel-taube. Also, the wings did not have the under bracing found on the earlier Taube types, making it a cleaner and easier to build aircraft. And, last, the landing gear is advanced from the swinging cross-wind type seen on the earlier versions.

Why two modes of power? Well, during the 1977 Nats, a young lady named Kathy McDaniels asked if I could design a rubber powered Taube? I needed a new model for the Vegas Vulture's CO-2 World War I event for Jan. 1, 1978. As she needed a Taube, and I needed a Taube, it seemed like a good idea to design and build both. Kathy and I looked at the different Taube drawings that I had from Richard M. Zasadney and picked this one. Mr. Zasadney has at least twenty four different Taube drawing on file. If you wish to see more, his address appears on the plan sheet. Also, if you intend to enter scale contests you will need a scale drawing for your presentation.

One more thing, and then we will get on with the building of the model. I would like to know if you readers would like any more Taube drawings, and what mode of power you would like to use? Also, if you have any trouble reading my drawings? I hope to have a Rumpler Taube on floats by next Spring with gas (.020) power. Keep in mind that if the model will not fly well I will not publish it. You can write me care of this magazine.

Now for the models. The only difference between the two is the CO-2 model uses basswood for the fuselage frame and the rubber model is happy with medium balsa. The CO-2 ship weighs 1½ ounces while the rubber version scales ½ ounce minus prop and rubber. The wheels are handmade on my models, but one can order some from Fulton Hungerford that look better than mine.

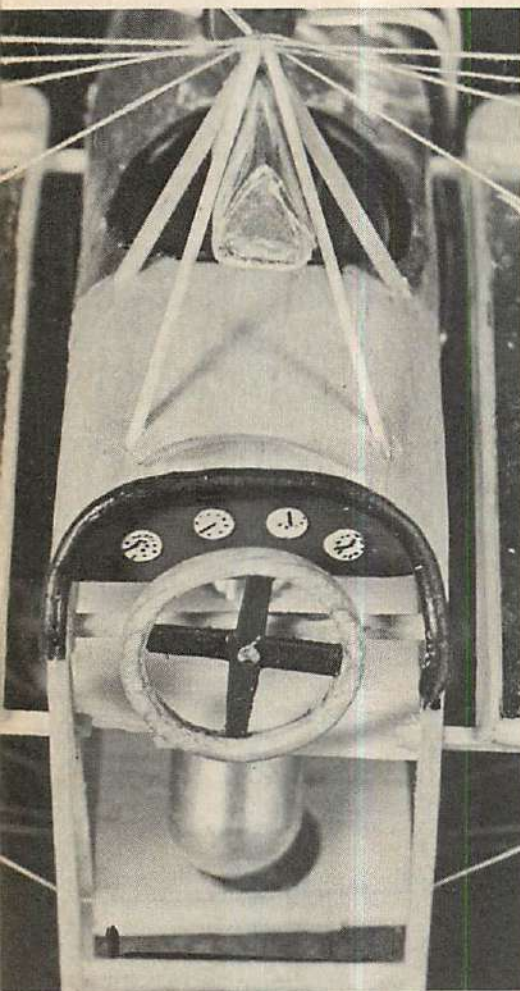
## The Fuselage

Start by gluing the 1/16" sq. pieces on the



side view of the drawing, then remove it and make another just like it. Be sure to put the fillets in at the front of the model, then the cross-pieces as shown on the top view, being sure to keep the fuselage square while gluing it. Next trace the  $\frac{1}{16}$ " sheet front section from the drawing on to the wood and cut it out, then glue to the front of the frame. By the way, a good way to trace on to wood is to lay the wood underneath the drawing and prick through with a pin about every  $\frac{1}{16}$ ". This leaves the plan looking neat and it can be used over again. After the sheet pieces are dry, cut and fit, but don't glue it in! Pin the block in place and shape the outside, then remove the blocks and hollow the inside to the size shown on the drawing. Now glue the blocks to the sides and final sand to shape.

Bend the landing gear to shape and lash to



No transponders or anything like that type stuff. Simple, basic instrumentation easily represented. Notice CO<sub>2</sub> capsule tank visible inside cockpit.

the frame with thread, then glue it in. Cut top formers from  $\frac{1}{16}$ " sheet and secure in place. If you are building the CO<sub>2</sub> version, cut the engine mounting board, drill it for the motor holes, install 0-80 screws from the rear, glue them in place and install on the front of the fuselage. Now add the tank and fit  $\frac{1}{16}$ " sheet balsa at the top and bottom to keep the tank in place. Be very careful not to kink the tubing while installing it. Next is

the  $\frac{1}{32}$ " sheet decking (on either model). This is best done by soaking or spraying the balsa with water prior to wrapping it around the frames, then glue it on and let it dry. When it is dry, use a *very* sharp pointed blade and cut out the cockpit holes a little undersize, then sand them to shape for a better fit. Install the front "A" former on the rubber model (the engine mounting board is "A" on the CO<sub>2</sub> model). Give the whole works three coats of dope and set aside.

### Tail Surfaces

The rudder comes next. Trace the *inside* of the rudder outline on a piece of  $\frac{1}{32}$ " cardboard (as in a shoebox). Do both the top and bottom as they are different shapes. Cut these out and pin them to the building board with a piece of wax paper or mylar underneath. Soak a length of  $\frac{1}{32}$ " sq. basswood or balsa and pin one end to the top of one of the formers. Now with one hand keep tension on the wood by slightly pulling it while using the other hand to guide the wood along the form. You might break one or two doing this at first, but be sure the wood is really wet. Also, hot water will work better. After these are formed, let them stay pinned down for at least 12 hours, then remove them and pin to the plan. Glue the vertical pieces to them.

The elevator is simple to make. Pin the ribs ( $\frac{1}{20}$ " sq. balsa) to the drawing. Start with the outer one and work in, splicing each piece to the one before it as you go along. Then add the cross-pieces. These should be made to go across the whole span, that is, across the center where the fuselage will be. The reason for this is to give a more rigid structure to work with while covering it later. Take some sewing thread and starting at the front of the elevator, string it to the outrigger at the center, then to the back of the elevator on the outer rib. Start across each rib and cut a slot with a razor blade about  $\frac{1}{32}$ " deep on the end of the rib. Put the thread in the slot, pull firm but not tight and glue in place. Continue until you reach the other side of the front elevator. Give it three coats of dope and set aside. Also, give the rudders three coats of dope at this time.

### The Wing Assembly

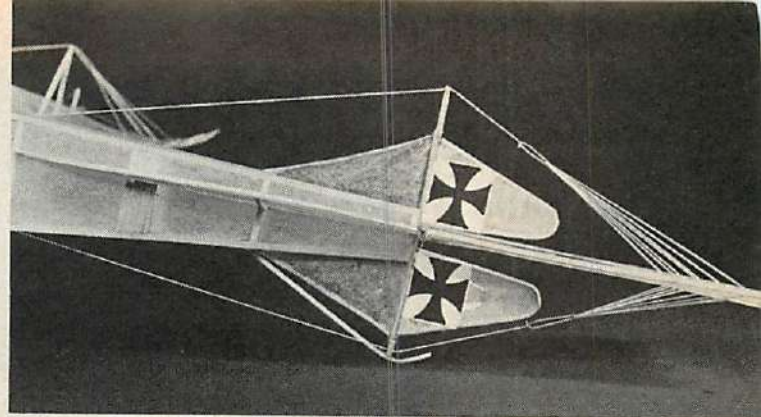
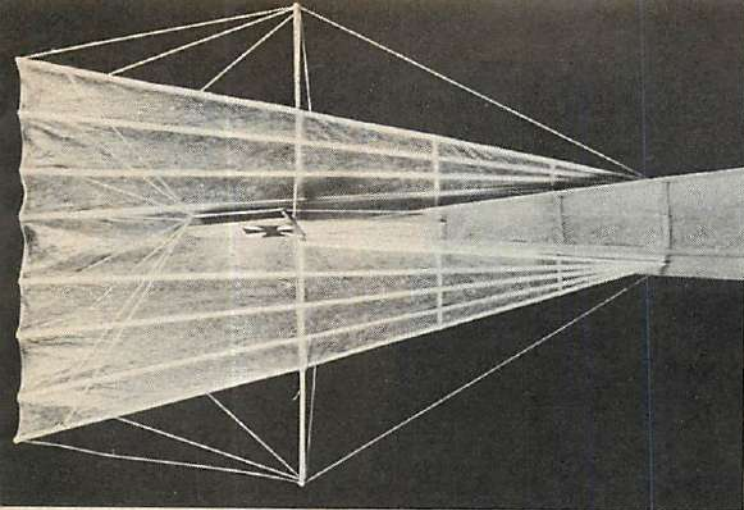
Don't panic! These are not as bad as they look. All the ribs are cut from the same pattern, so make a template from the curve of the wing rib on the plan. These can be of cardboard, or aluminum and should be just a profile template. Now, place the template on some light  $\frac{1}{32}$ " sheet balsa with the rib going with the grain. Make a slice along the template, now move the template down  $\frac{1}{16}$ " and then another cut along the template. Well how about that? A real  $\frac{1}{32}$ " x  $\frac{1}{16}$ " already airfoiled wing rib! The next thing to do is the leading edge. This is basswood as leading edges sure take a beating in flying. Make a template of the leading edge as you did with the rudders, soak the wood in hot water for about ten minutes, then pin and shape the wood to the template. Let it dry overnight. The next day remove and place on the plan along with the two wing spars. Notice that both spars are allowed to go into the fuselage about  $\frac{3}{32}$ ", and that there is a gap between the wing and the fuselage. It's a good idea to mark where the outside of the fuselage will be on each spar at this time. Start glueing ribs on, starting from the inside of the wing. The rib is a butt joint to the leading edge, and lays on top of the two wing

spars. Cut the rib off to length at the rear with a sharp razor blade, continue across the wing to the end rib. This rib is not butted, but sliced on the bottom to fair in with the leading edge. Now put the  $\frac{1}{16}$ " pieces in on the root of the wing, and the place where the bipod holds the warping cable toward the end of the wing on the rear spar. Next, put the  $\frac{1}{16}$ " square balsa at the rigging points and at the root to form the frame for the windows. Remove the wings from the plan, and round off the leading edge with sandpaper. Now make the bottom ribs from the same template and install between the front and rear spars. Make a cut on the rear of each rib as you did on the elevator, and string the thread in the same way. Put a piece of light  $\frac{1}{32}$ " balsa between the outer rib and the one next to it to prevent the rib from pulling in after doping it. Very carefully install some thin but stiff acetate at the top and bottom in the window area. This will prevent this end from pulling in. Now give the wings three coats of dope and set aside. In spite of the wings looking like some fish the cats picked clean, they are done!

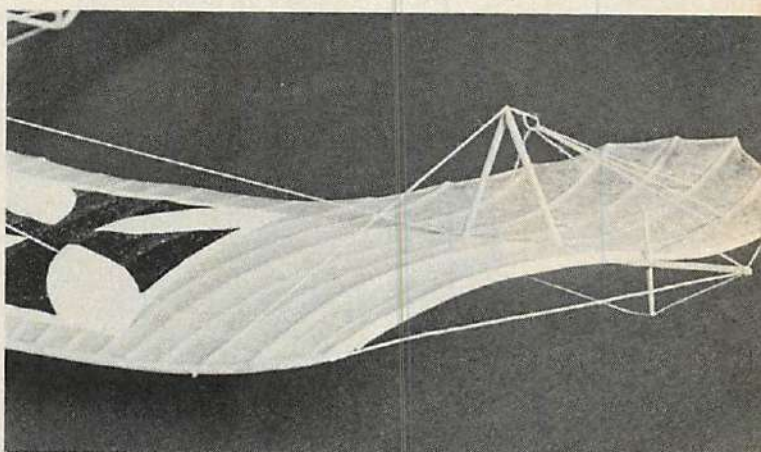
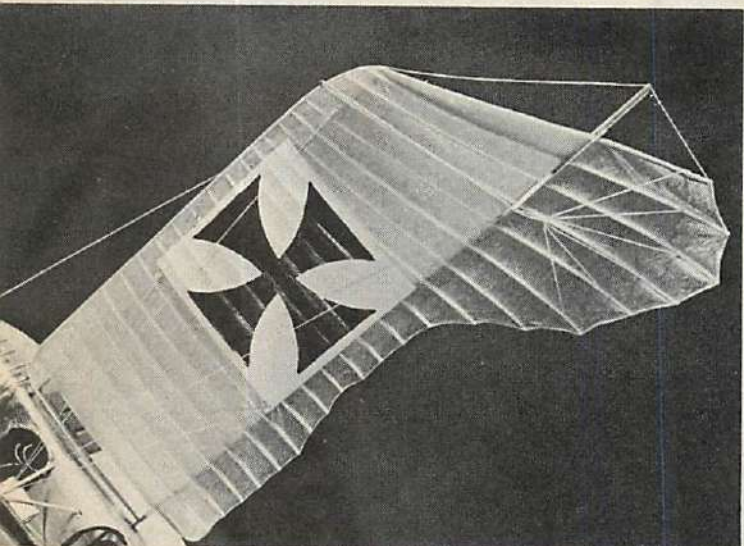
### Covering

The real aircraft had a covering of linen, this could be from white to a rather dark brown color, so choose the color tissue you want and start on the fuselage. I would like to caution you against using the white glue method for covering at least the wings. Due to the undercamber, the paper will pull away when you try to shrink it. Use dope to hold the tissue to the framework of the whole plane. Now, about those trailing edges of thread. Cut the tissue about  $\frac{1}{16}$ " to  $\frac{1}{8}$ " beyond the thread, then fold over this excess and crease it with your thumb nail. Put some dope between the tissue and on top of the flap, if it does not hold together, use your fingers to squeeze out the remaining air, and add some dope again. The elevator is covered on the top *only*, while the rudders are covered on both sides. The bottom of the wing is covered from the leading edge to the rear spar. The last part is covered on the top surface only. After the fuselage, rudders, elevator, and wings are covered, *lightly* spray a mist of water on the surfaces, and allow to dry at room temperature. I used a non-tightening nitrate dope on the two models shown and had no trouble with warps. Why did I use nitrate dope? Because it dries completely in about 48 hours and does not seem to warp after that, where as butyrate dope seems to take about three months to really stabilize. You can find non tightening nitrate dope at most aircraft supply houses. As the dope is really thick, it is a good idea to buy the same amount of thinner and cut it by at least 50%. Put no more than two coats on the model. Let set for 24 hours, and remove any warps by passing the warped area over a low flame at a distance of at least 9 inches. Lay out the squares and crosses on the rudders and wings, both sides on each, and paint them with either colored butyrate, thinned, or better yet, nitrate with a little Flouquil railroad paint in it. Put a coat or two of clear dope on the decking where the cockpit is, but not where the aluminum is to be. The aluminum covering is from the inside of a cigarette pack, this was useful as it has a paper backing that the glue could stick to. Start at the bottom and glue a piece from the rear landing gear strut to where the balsa block starts for the nose, then glue the piece to the front, as a wrinkle starts to form, slice

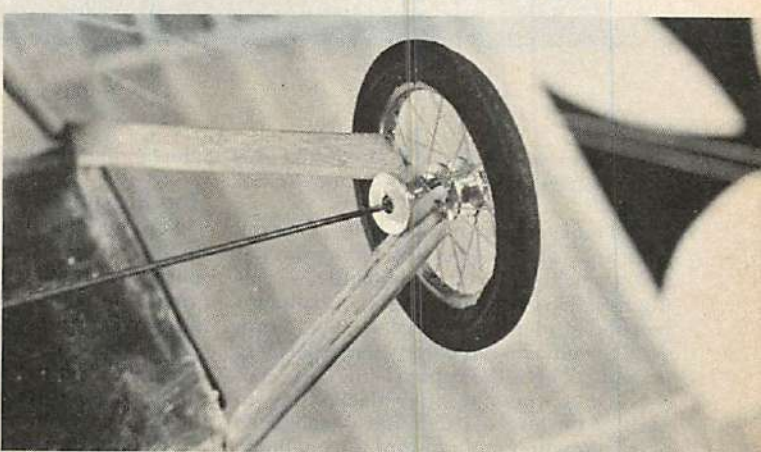
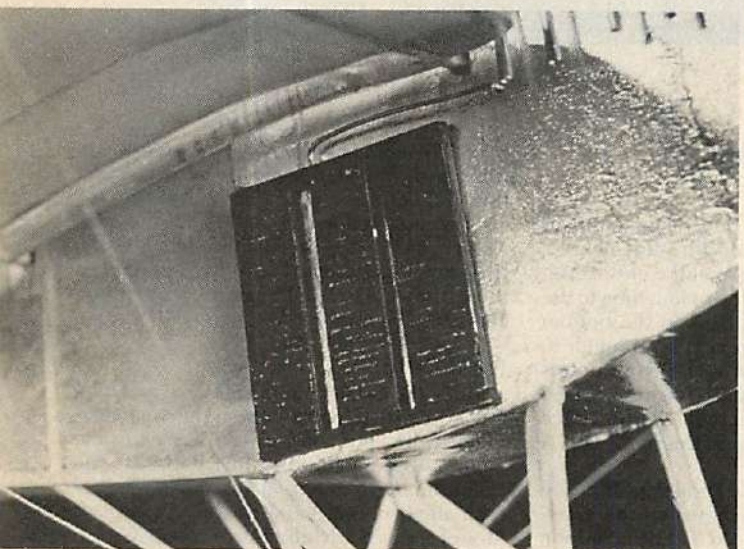




The vertical tail surfaces, a basswood outline wrapped around a form. Tissue covers it. Build an upper and lower, they're not identical. **At left:** Stab is almost a set of tail feathers, thread rigging provides a degree of rigidity.



Talk about washout. Perhaps the bird that inspired it knew which end was up, but it all works together, a fine flying replica. **Left:** Built with delicacy, a frail but well ribbed appearance. It's actually not too hard, fun to rig.



The straight axle is simply lashed in position with tiny dental rubber bands, offers mild degree of shock absorbsion. Undercarriage is easily assembled. **At left:** Scribed aluminum foil glued to 1/16" sheet represents the radiators.

the foil and overlap it. Trim the overlaps off to form a smooth surface when it's done. Do the sides in the same way, but lap over the bottom about a  $\frac{1}{8}$ ". The top is put on the same way but is butt joined to the sides. The nose block should be made now for the rubber version. Make sure that the piece that goes in the hole is a firm fit and is at least  $\frac{1}{4}$ " thick. Drill for the nylon thrust bearing, being sure that you provide down thrust and

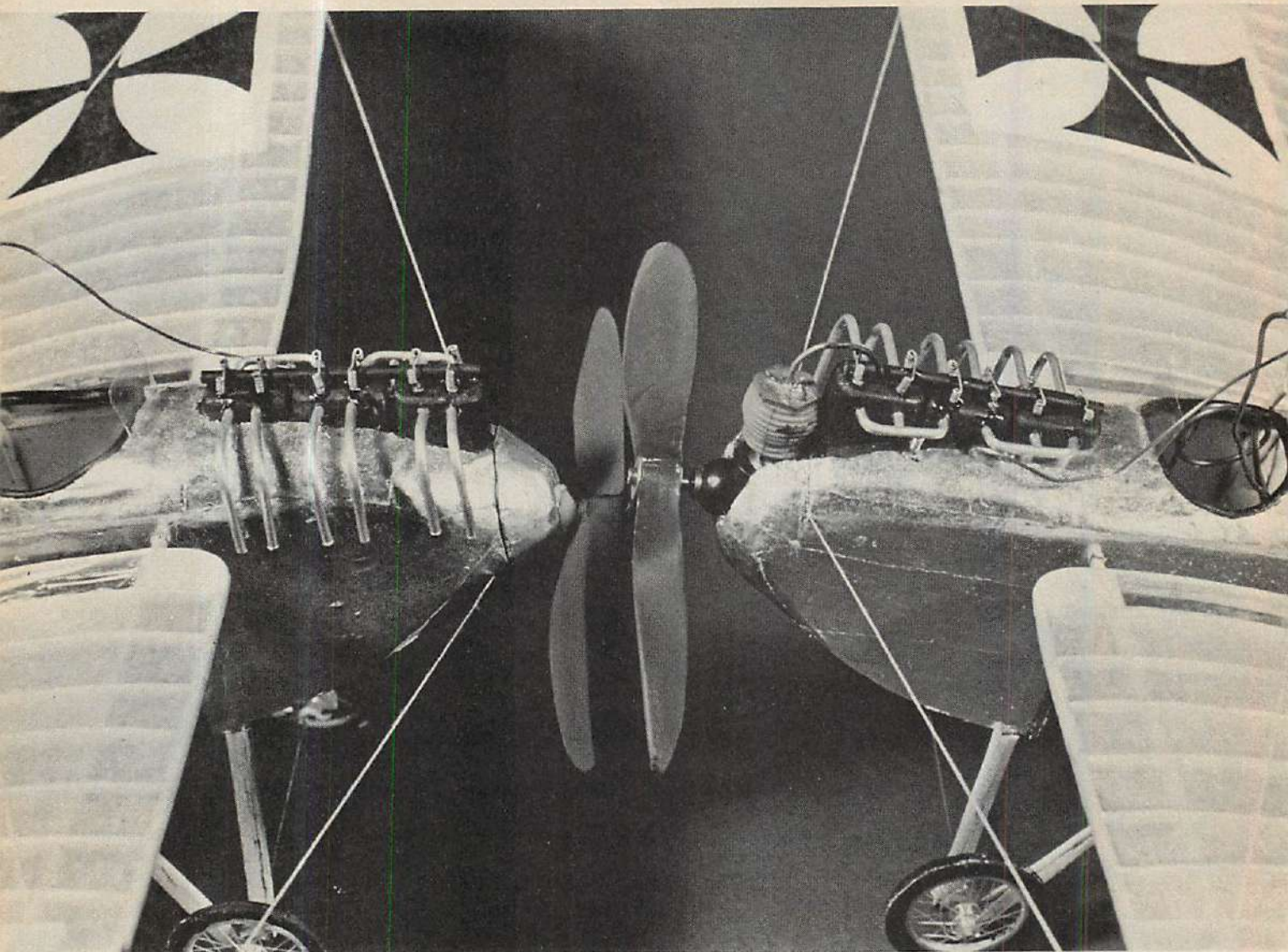
some right thrust while doing so. Now cover this with aluminum foil also.

### The Engine

The cylinders are made of balsa, sanded smooth and painted black. Mark a  $\frac{1}{4}$ " strip down the center of the cowling on top and remove the foil from this for the engine to sit in, paint this area black. Glue the cylinders in place and let dry. Glue a piece of  $\frac{1}{16}$ "

diameter dowel on top of the cylinders, paint black, then wrap some thin aluminum or copper wire around a pin to form the valve springs as shown in the drawing, and glue in place and paint black. Make the intake manifold by carefully bending  $\frac{1}{16}$ " dia. aluminum tubing with round nosed pliers to shape. This is best done by bending a little at a time to avoid kinking. Drill a hole in the cylinder block, and glue the tubing in, Hot





Stuff works well here as a glue. Make the exhaust pipes the same way and install them.

The radiators are made of balsa, then the wide areas are covered with aluminum foil that has been grooved to simulate the cooling fins. This is done by using a ballpoint pen and a ruler on the reverse side to produce the grooves, an empty pen makes less of a mess. This is then glued to the balsa, and the whole works painted black. Glue in place on the fuselage, then add a small piece of copper wire from it toward the engine to look like a water pipe.

### Assembly

Make the vertical strut that the rudders go on and glue it to the rear of the fuselage. Glue the strings that form the fin outline from this strut to the forward part of the fuselage. Cut and dope on a piece of tissue in this area. Add the tailskid made of bamboo. The best way to bend the end of this is to form it over a hot soldering iron. Cut the centers from the elevators and glue it in place. Be sure that it is lined up as shown on the drawing. Make the two pylons that hold the wing rigging and glue them in place on the top and bottom of the fuselage. Put the wings in place, and raise the ends up  $\frac{1}{2}$ ",

glue and let dry overnight.

### The Rigging

Start with the wings, tie a piece of thread to the bottom pylon and, with a fine needle, push through the rear spar at the closest rigging point, come to the top pylon, then to the other wing, through it, back to the bottom pylon, then to the forward spar, through it, and so on, do not glue at the wing points until you are certain that the wings are free of warps or wash-in (where the trailing edge is lower at the tips than at the root.) If it is lined up glue it in place.

Put the rigging on the rudder post to the elevator cross-piece as shown on the drawing. Take a piece of thread and tie a  $\frac{1}{4}$ " loop at the end, glue this on top of the rudder post, leaving 1" of thread behind the post. Take the other end and glue it in place as shown on the plan. Do the same at the bottom. Tie a thread to the bottom loop, thread it through the rib nearest the center, *don't glue it*, through the top loop, through the opposite rib nearest the center, and back to the bottom loop. Continue to the next rib out until all the ribs are strung.

Make the bipods for the wings and glue them in place. When dry, make a loop again as in the elevator, and glue to the top of each

bipod. Insert a cut pin as shown on the leading edge in the plan, wrap the thread around this and continue to the bottom of the rear cockpit, glue it here. Tie a thread to the third rib in from the tip, thread it through the loop, and down to the fourth rib, tie and glue it there, then cut it. Do the same for the second and fifth rib, and the first and sixth rib.

### Final Details

Make the gas tank from balsa, cover it with foil, and glue it in position on the top pylon. Place a piece of copper wire from it to the engine on the manifold side. Fabricate the axle from  $\frac{1}{32}$ " dia. wire and fasten it in place with small dental bands, or elastic thread. Mount the wheels, then drill a hole for the rubber peg and use  $\frac{1}{8}$ " dia. dowel or bamboo for the peg. Now set back and admire your model, it's finished!

I found that the rubber model required a small amount of clay on the nose to fly well (about the size of a green pea. The CO-2 model required no extra weight. If it glides too steeply, move the elevator up a little, if it stalls, move it down, (see why we didn't glue it?). Use a little left rudder on both. This is very important if you are flying indoors, as the circle will not widen as the power runs down. Hope you enjoy it.



GERMAN AIRCRAFT OF  
THE FIRST WORLD WAR  
PETER GRAY & OWEN THETFORD  
PUTNAM & CO. LTD  
PHOTO, PAGE 429

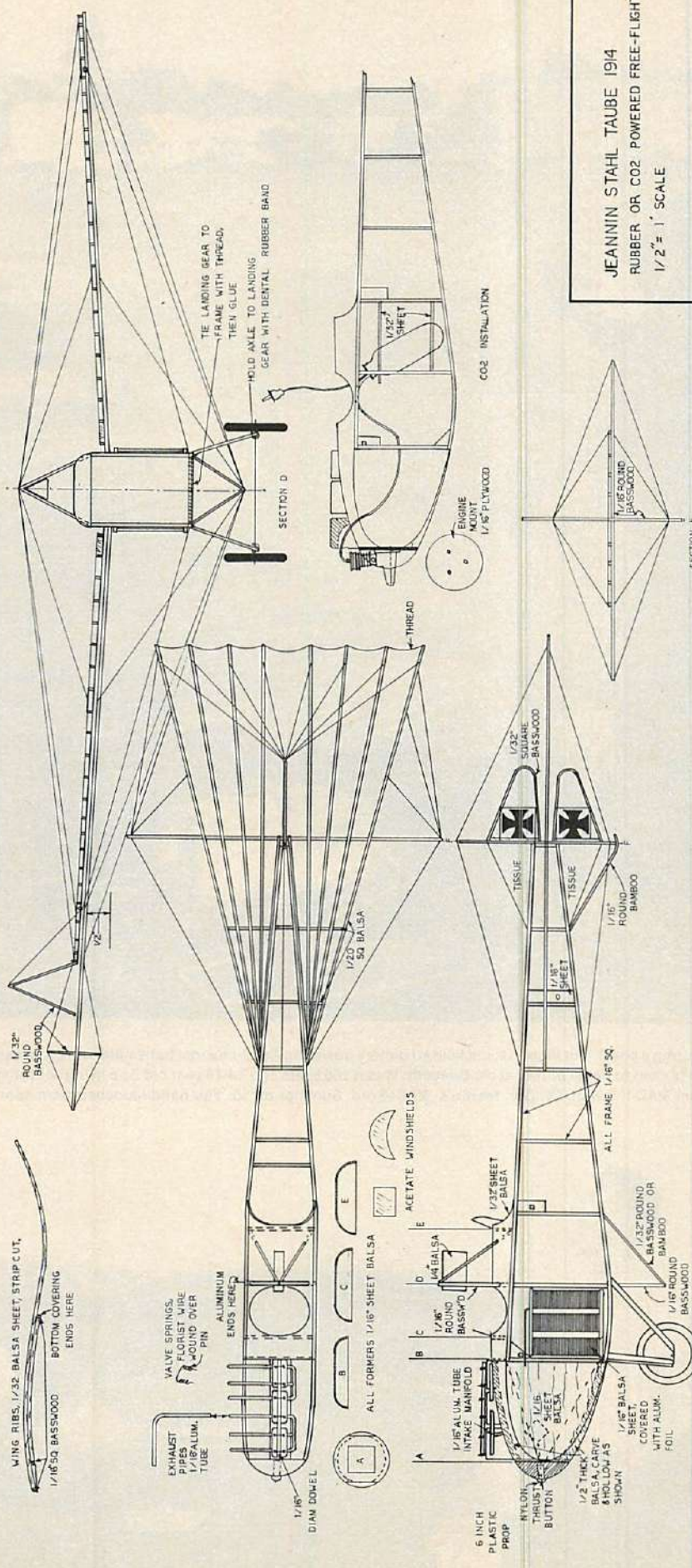
TRIM DATA:  
FLY LEFT, RUDDERS TRIM  
RUBBER, TWO LOOPS 1/8  
TERN AERO 6" PROP  
SLIGHT DOWN ELEVATOR

JEANNIN STAHL TAUBE 1914  
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# Some thoughts on R/C power sources

If you now have a dry battery in your R/C transmitter here is a practical and inexpensive alternative to consider from **Bob Aberle**

Nickel-cadmium rechargeable batteries have been successfully used in radio control equipment for many years now. Over these years the technology has steadily improved enabling higher capacity, lighter weight and the capability of rapid charging. Unfortunately there has never been a price break or reduction in cost of these cells. To this day individual cells still sell for \$2.00 to \$3.00 (the higher the capacity usually the higher the cost). On the average a ready made airborne battery pack (four cells/4.8 volts nominal) runs around \$15.00 and a transmitter, rechargeable pack (usually eight cells/9.6 volts), can run anywhere from \$20.00 to \$30.00.

In recent years various R/C manufacturers have marketed economy type systems which delete the rechargeable transmitter batteries, substituting a single 9 volt dry battery (which cannot be recharged). This clearly reduces the cost of the overall system and also eliminates the need for a dual output battery charger. I had my first experience with a dry battery powered transmitter recently when I built up a new Ace three channel Digital Commander system kit (see FLYING MODELS, September 1977, pages 30 to 33). This particular Ace transmitter employs a dry battery (either an Eveready 276 or a Burgess D-6) which lists for \$3.00 to \$4.00. My particular Ace transmitter draws close to 200 ma. (total current drain). At this current level I found that my battery would only last for a few hours. Ace claims approximately 10 to 15 hours of operation out of a fresh battery. In my particular case I discovered that the batteries I was purchasing from a local electronics supplier had been apparently on the shelf for a considerable period of time. In other words they were not fresh (something less than full capacity). This happens to be a common problem with these particular size batteries since they are no longer very popular. About the only call for



Bob during a check-out flight, 12 volt field kit battery powering Ace 3-channel transmitter. A 12 foot cable length proved to be no bother at all. **Beneath:** Was it 100 years ago? A 16 year old Bob flying with single channel MAC-II 5 watt TX. Don Martin's '53 DeSoto. Summer of '55. You hand-launched from spot.





these batteries appears to be for the R/C hobby industry.

The easy solution to this problem would have been to simply invest in a set of eight, nickel-cadmium, rechargeable cells. Ace offers a special set for \$16.00 at the present time. A battery charger would be extra if you didn't already own one. I started thinking about an alternative power source for my transmitter. The first thought that came to my mind was my car. A cigarette lighter plug (available from Radio Shack Stores) is an easy way to tap off the car's 12 volt battery system. The 12 volts, in turn, could easily be dropped by a single resistor to the 9 volt working level required by my transmitter. Well I tried this approach and it did work.

But suppose your local flying field doesn't permit cars on the flightline. Most certainly wouldn't for safety reasons. How about another external power source, your 12 volt field kit battery? Yes, that's right, the little lead acid or gelled electrolyte battery you carry around to power your electric engine starter, fuel pump, power panel, etc. I did a few quick experiments and came up with a little circuit that is intended expressly for my Ace three channel transmitter. Even with a brief electronics background you could easily adapt this idea to other brands of R/C transmitters.

In my particular case I employed the M.E.N. gelled electrolyte batteries (two 6 volt units in series for 12 volts) as the power source. These particular batteries were reviewed in the December 1976, FLYING MODELS, page 36, in case you are interested in the details. They are rated at 6 ampere/hours. The 4 ampere/hour, single 12 volt batteries distributed by Astro Flight and Sullivan Products should work as well. The normal operating voltage of a 12 volt gelled electrolyte battery is oddly enough just around 12 volts (that wasn't meant to be funny!). Minimum voltage at close to full discharge is around 10.25 to 10.50. For my Ace transmitter I wanted an input voltage of approximately 9 volts (when the source battery was at close to full charge). My particular transmitter draws exactly 190 ma. Using Ohms Law:

$$R = \frac{E}{I}$$

where R = Resistance in Ohms

E = Voltage drop (in this case

12.0 - 9.0 = 3.0 volts)

I = Current in Amperes

(in this case

190 ma. = 0.19 Amperes)

Substituting in the above equation:

3.0 Volts

$$R = \frac{3.0 \text{ Volts}}{0.19 \text{ Amperes}} = 15.7 \text{ Ohms}$$

The closest commercially available resistor to this value is 15 Ohms (actually very close to what we calculated!). You must also determine the power rating of the resistor. Use the formula:

$P = I^2 \times R$  where P = Power in Watts

I = Current in Amperes

R = Resistance in Ohms

Substituting once again in this equation:

$$P = 0.19 \times 0.19 \times 15 = 0.54 \text{ Watts}$$

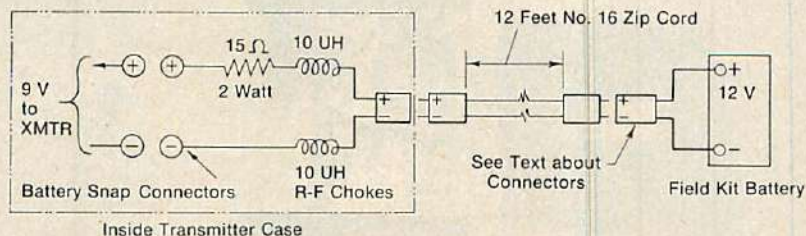
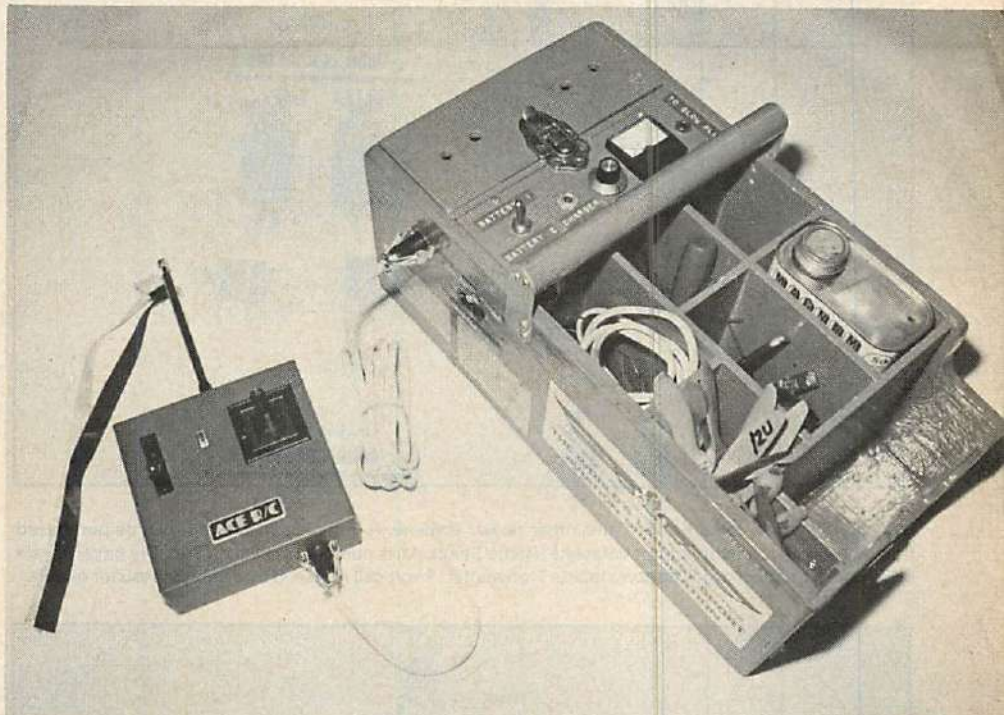
I could have selected a one watt resistor, but to be conservative I chose a standard two watt style. This type resistor is easily available at local electronics stores.

The actual wiring diagram for this transmitter power source scheme is shown in Figure (1). The interconnecting cable is 12 feet of No. 16 gauge lamp cord or zip cord as

FLYING MODELS



Ace TX required a dropping resistor, 12 volts to 9. Cox/Sanwa operates on 12v, no resistor is needed. Below: Ace Transmitter connected to M.E.N. electrolyte batteries. Note rubber restraint, can't unplug.

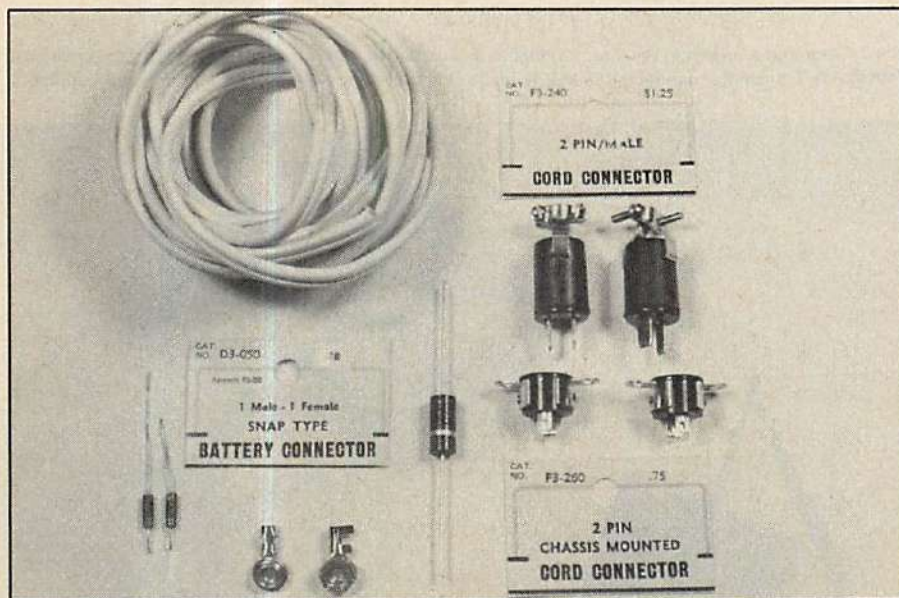
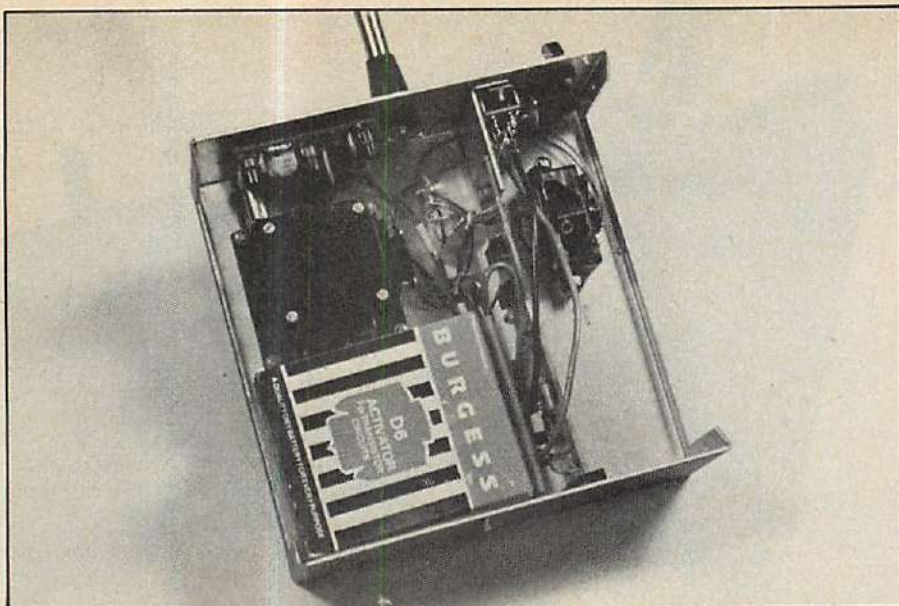


TRANSMITTER POWER FROM A 12 VOLT BATTERY  
(This Circuit for Ace 3-Channel Transmitter  
Will Vary for Other Manufacturers)

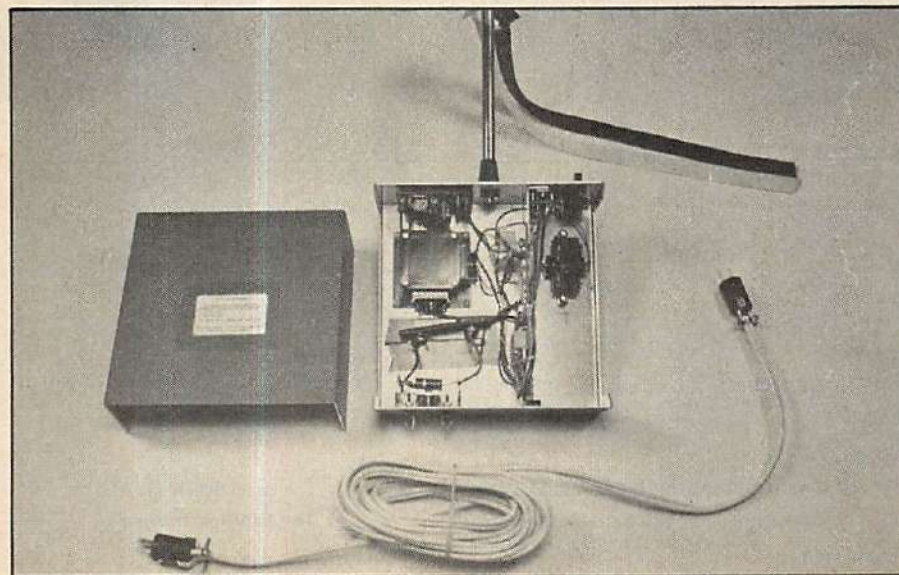
A Basic Schematic ...  
Text Explains the Details

Fig. 1





Basic components required for Transmitter power scheme. R-F chokes (lower left) can be purchased from Ace, snap connectors from Lafayette. Radio Shack parts numbers are listed. **Top:** Dry batteries are expensive, can't recharge. **Bottom:** Inside Transmitter. 9 volt cell replaced by dropping resistor circuit.



it is more often called. Make sure you obtain No. 16 and not the more common No. 18 gauge size. The choice of the 12 feet length was somewhat arbitrary. You don't want to make it too long since a certain voltage drop does occur due to the resistance of the wire itself. The longer the wire length, the more the resistance. For connectors I selected the two pin "Beau" type (that's short for the Beauchine Series 3300 connector series). Although I was able to purchase mine locally you could obtain them through the Radio Shack catalog (Male cord connectors—two pin- #274-201— \$1.19 each and the mating half Female chassis mount connector—two pin- #274-203— \$0.69 each). Two sets are required. One for the transmitter end and the other for the field kit end. Initially I tried to obtain locking type connectors. Without a positive lock the power cable might be easily disconnected while the model was in flight. A crash would then be moments away. Self locking connector sets can get very expensive. I chose the inexpensive "Beau" type and added small metal hooks to each side of the connector. To these hooks I attach several small rubber bands which hold the plugs firmly in place. Remember also, the plugs and sockets must be polarized, otherwise the transmitter could easily be damaged by applying a reverse polarity battery source. I tried to keep the actual modification to my Ace transmitter to a minimum. As such I only required a  $\frac{1}{8}$ " diameter hole plus two small screw holes in the bottom of the case to mount the female connector. Just inside the case I installed two terminal strips to hold the dropping resistor and two small R-F chokes. The addition of the R-F chokes was an afterthought. I wanted to make sure that stray R-F energy wouldn't flow out the power cable. The cable, in turn, could easily radiate this stray energy, especially if its length were an even multiple of the transmitting frequency wavelength. The two 10 uh (micro henry) R-F chokes were left over from my Ace kit. They are used during the tune up procedure only. The actual use of R-F chokes may not be necessary, but it seemed like a good idea at the time. You can order these National R-33 style chokes from Ace R/C as part number 17K27 (list price .50 cents). The actual hook up to the transmitter battery terminals (inside the case) was made with a mating set of snap type connectors (Lafayette catalog No. 34P 10016 and 34P 10024 - one each required). By using this type of connection you can always easily return your transmitter to dry battery power.

How did my dropping circuit work in actual practice? With a full charge on the 12 volt source battery I obtained a voltage (under a 190 ma. load) at the transmitter of 8.8 volts. When my gelled electrolyte battery was almost fully discharged I still was getting 7.2 volts into the Ace transmitter. Ace indicates that the transmitter can normally be operated down to 7.0 volts. So this worked out well. Next check was for variations in the power output with the transmitter held in various positions. I clipped my R-S Systems R-F Output Meter to the transmitter antenna (at the midpoint) for this check. I tried all kinds of locations, including the antenna directly next to the power cable, without any noticeable affect to the radiated power output. Final check was to see how the transmitter would operate when the engine electric starter motor was put in use. You wouldn't fly under this condition,



but you would normally have your R/C system turned on while starting your engine so that the throttle can be operated. I found that my Kavan starter (rather high current drain) did reduce somewhat the power output of the transmitter, but not to the point where it affected the radio operation. My throttle never moved unless I commanded it.

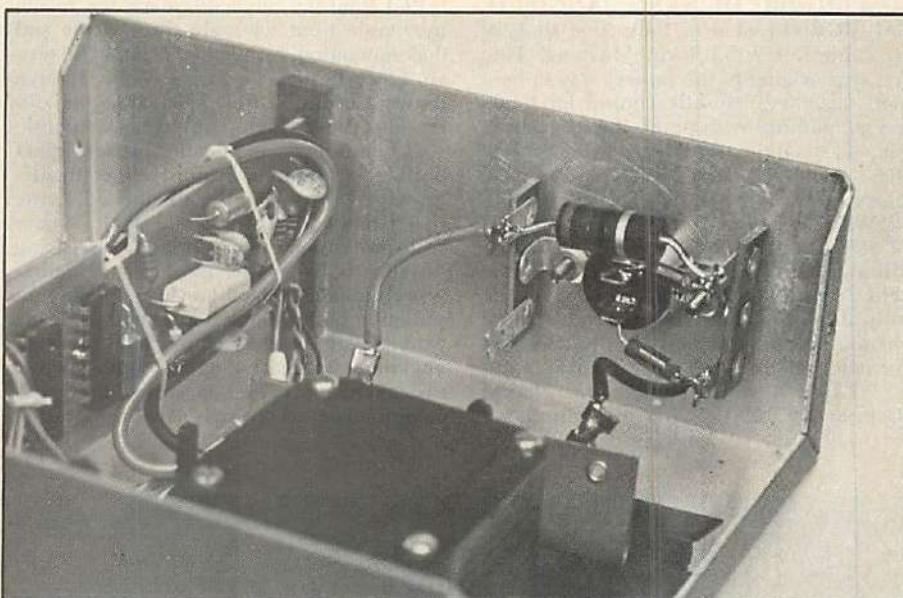
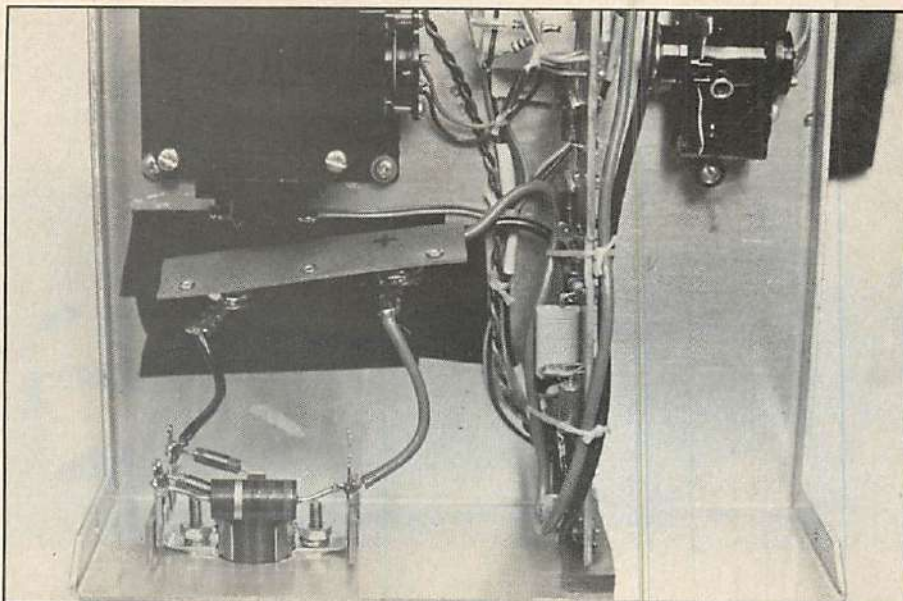
What was it like to use the transmitter under normal flying conditions? Surprisingly enough I didn't feel restricted by the 12 foot cable length. I never normally drift very far from my field kit anyway. I have not yet pulled on the cable once while flying. Those who flew years ago with the old MAC II or MAC-50 single channel transmitters must remember what it was like to be tied to an automobile (for dynamotor power) and also having a keying switch at the end of a long cable. I remember clearly hand launching my R/C models with one hand while holding the key (switch) cable in the other hand. True, you do sacrifice a little in portability, but the cost savings in batteries is well worth it. If you own several transmitters and use this power source scheme, you only have to charge and maintain one battery (the one in your field kit).

There is one caution to note. I have only explored one transmitter (namely the Ace three channel Digital Commander) to date. Some of you might want to replace a bad set of nickel-cadmium batteries in an existing transmitter by using this scheme just presented. Be careful! On many sets the manufacturer taps part of the battery pack to obtain a lower voltage. For example, some sets tap at the fifth cell to obtain 6.0 volts to power just the encoder portion of the transmitter. The full eight cells (9.6 volts) is only applied to the power output stage. If this were the case, hooking up a single dropping resistor for a 9 volt input could render the transmitter inoperative. Of course, as always, recognize that any modification made by you to a piece of commercial R/C equipment will void the normal warranty. Consider this before diving into that transmitter.

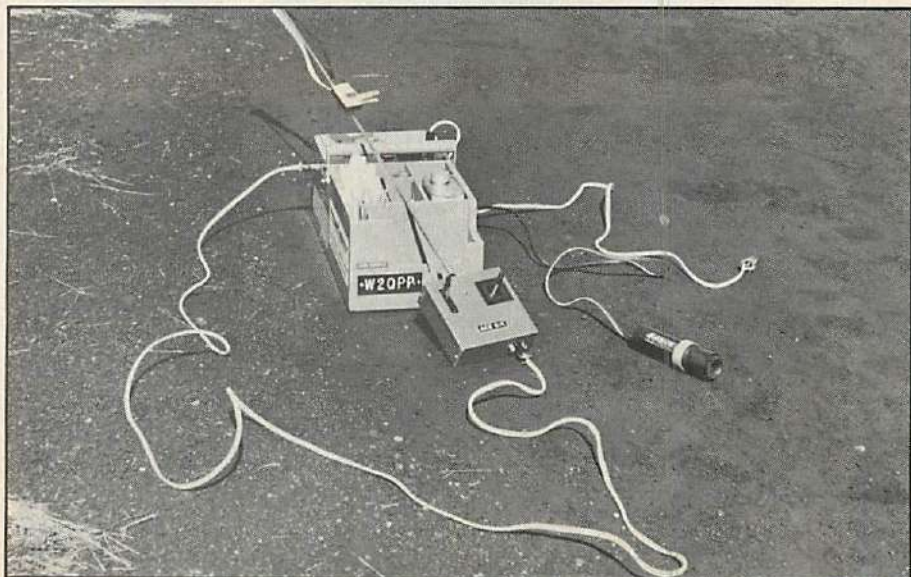
I really didn't intend this as a full construction article. I wanted it to be a little thought provoking. Hopefully, some of our R/C manufacturers will explore this type of alternate power source in the future. I have already passed on an advance copy of this article to Mr. Paul Runge of Ace R/C Inc. to see if they might be interested in offering a modification kit for their transmitter in the future. Owners of the little Cox-Sanwa dry battery transmitter would be very interested in this scheme. This two channel transmitter operates on a 12 volt supply (eight dry alkaline cells) which cost over \$6.00 a shot. In this application the 15 ohm dropping resistor could be eliminated with the 12 volt field kit battery operating the transmitter directly.

As a final note for the more advanced R/C experimenter, I did try a zener diode regulated circuit. A 9.1 volt, 10 watt zener did a nice job. It does require a little extra wiring at the transmitter power switch, otherwise the zener could draw power even when the transmitter itself is off. Several alternatives were considered, but since the simple dropping resistor worked good enough I didn't feel the extra complication of a zener diode was really worth it.

Look it all over. If you come up with additional ideas on this subject please write to us so we can share your experiences with our other readers.

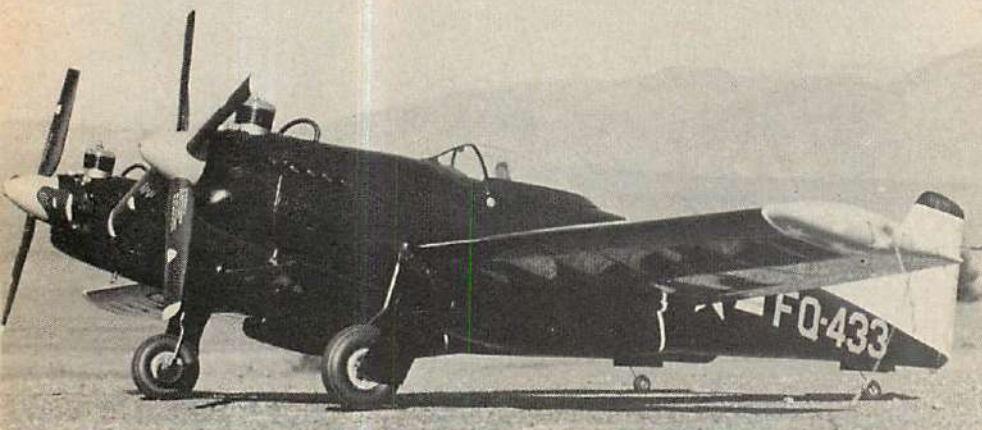


Two R-F chokes, 15 ohm 2 watt resistor mount directly to terminal strips. Flexible wire to connectors, observe polarity! **Top:** Transmitter connector wiring. Tape placed behind connector to prevent shorts, lacing cord halting movement. **Bottom:** Extra load of starter reduces output for moment, not a problem.





# Barnstorming



**TOM MOORE OF SAN FRANCISCO, CALIFORNIA**, sent us these fine shots of his control line F-82 Twin Mustang. Tom says that originally the project was to be a sport scale with throttle control for touch and go landings with profile fuse construction. As sometimes happens when a bug bites a modeler, Tom's addiction to scale realism got to him and the fuselages got fatter. We'll let Tom take over from here:

"Aside from a long standing infatuation with twin mill machines (e.g., a 1"-1" scale Aero Commander 560 was my control line entry at the 1963 Los Alamitos Nats.), there was the lingering memory of the late Walt Musiano and his F-82 adaptation of Scientific's 1/2A P-51 kit which appeared in a book of his from the 1950's. This inspiration, re-

called from my boyhood years, led to the inevitable hunt for scale three-views and documentation. Friend and aviation historian, Larry DiRicco, enlarged Willis L. Nye drawings (M.A.N., Feb. 1962) to several different scales. Having selected a suitable size, I undertook modification of the original outline for optimum flyability. Specifically, fuselages were slightly lengthened, wing tips extended. Care was taken to preserve scale proportion by appropriately increasing distance between the fuselages. Dihedral was eliminated to facilitate lead-out wire installation within the wing. The glass cowls would easily have accommodated inverted engine mounting, but as the emphasis was to be on ease of operation, scale fidelity was compromised accordingly. Also, the landing



gear was located forward of the true scale position to take advantage of plywood fuselage formers. Body mounting of gear was thought preferable to the more scale wing mounting since take-offs and landings were to be the forte of this ship.

"The paint scheme, along with pin striping, stars and other markings are representative of an F-82F belonging to the 5th Fighter Interception Squadron, photographed at Redding, Pennsylvania May 1948 (refer Scale Modeler, April 1974). Light rubbing followed by a coat of wax and the ship was ready for test flying.

"I should point out that the four-bladed props and spinners were scratch built for static display purposes only. Even a sport scale F-82 looks "undressed" without them! The blades are laminations of 1/32" sheet plywood and sheet balsa, while the spinners are molded fiberglass.

"With the 4 oz. metal tanks dry, the completed model weighed 82 oz. Not bad when considering two entire fuselages are joined to produce a single aircraft. Surprisingly, the C.G. was found to be acceptable at 25 percent of root wing chord. Though the plane is by no means small (e.g., span is 61", length is 37"), the effective wing area is a modest 468 sq. inches, resulting in a wing loading of 25 oz./sq. ft.

"Initial test flights were made with motors unmodified. Later, Tatone Peace Pipes were added after adapting with fittings for fuel tank pressurization. A Robert's system provided flight and throttle control at the end of three 57' 4" lines. The least I can say about performance in the air is that the F-82 flew "right off the drawing board", as the cliché goes. Take-off is pretty much automatic as long as one remembers to haul back on the handle some time after roll-out. The ship tracks beautifully. With four wheels in contact with the ground it's a plane that handles like a car.

"Rotation is accomplished with neutral elevator, but a conscious and firm application of "up" is necessary to get it airborne. Control response is smooth throughout the entire speed range. In short, the airplane exhibits no bad tendencies in any attitude. Furthermore, despite my early fears, line pull is positive with either engine out, even at full power. While less than aerobatic, the "Twin Mustang" is agile enough in climbs and dives to quicken even the jaded pulse.

"During the 1976 World War II Scramble, I had the good fortune to thrill to Col. Thacker's flying of his R/C version of his own famous "Betty Jo". At that time I remember envying the freedom of movement that R/C provides, especially in executing scale maneuvers. On another occasion shortly afterward, however, I celebrated the maiden flight of my own F-82 and experienced what the R/C jockey misses: the *feel* of flight. Through the control handle every sensation is transmitted, from engine vibration to the physical strain associated with high speed line pull. The excitement generated in this fashion by a roaring twin is definitely a thing to behold in the *hand*, as well as in the *air*." ☺

## BARNSTORMING PHOTOS

are welcome. We prefer 4x5 or larger glossy paper, black and white only please and we pay \$5 or more for each one used in this section.



I guess it was about 3am when I was awakened by a disturbance in the cellar. It sounded like voices but since no one could possibly be in my cellar at that hour, I suspected that it was either my imagination or that I had forgotten to turn my radio off. Anyway, being the brave soul that I am, I proceeded to slowly unlock the cellar door, and, armed with Bunnie's new wok, I quietly crept down the cellar stairs. About halfway into the fourth step I heard the voices again, and being somewhat intelligent, stopped dead in my tracks with wide open eyes and ears. I know that this is going to sound ridiculous but the female voices were coming from my new Smith Miniplane and my old Pitts Special! It only took a moment more to realize that the two little ships were arguing over yours truly. The Smith was telling the Pitts in no uncertain terms that as of Sunday, she would become the love of my life as far as any scale biplane was concerned. The Pitts retaliated with a remark stating that no other biplane could take her place since she was the only scale biplane with true aerobatic capabilities. To make a long story short, the Smith's last remark went something like this, "Just wait until tomorrow and I'll fly rings around you!" Well I quickly ran down the last seven stairs but the voices had stopped completely. I slowly returned upstairs hoping to catch another few words but the only thing making any noise was the old creaking stairs. I tried to get back to sleep but it was very difficult because I found myself wondering if the Smith would turn out to be right or wrong. Well tomorrow was Sunday, the day for the first test flight, and I would find out soon enough. Now to spare you all the aggravation of flipping to the flying section of this review let me just say that Sunday turned



## Sig's Smith Miniplane

This offering from Sig's  
stable of fine flying birds  
is here to win/Frank Tiano

out to be a beautiful day weather wise and flying wise. The Smith wasn't lying.

The Smith Miniplane is a stand off scale biplane designed by Mike Gretz and offered by Sig Manufacturing Co., Inc., Montezuma, Iowa 50771. It's a cute little number intended for any type of competition whether

it be stand-off or biplane events. The real Smith Miniplane is just an overgrown model with a wingspan totaling a mere 17 feet. Total area of the full scale ship is only 100 sq. feet. The name Miniplane seems appropriate enough for this 1/2-ton of flying delight.

In model form the ship will do everything the real one will do, only quicker. Sig markets the little jewel for a sensible \$49.95 and includes almost everything needed to finish the kit. Besides a good selection of top quality balsa and plywood, there is also an ABS plastic cowl, wheelpants and headrest. Some of the other goodies include prebent landing gear and cabane wires, hinges, torque rods, threaded links, control horns, aluminum engine mounts, and assorted miscellaneous hardware like nuts, bolts and screws. Also included are two large full-size plans complete with diagrams, a magnificent construction manual with many photos, and a beautiful full color decal sheet completely free of any cracks. The builder simply supplies his time and talent along with an engine, radio, fuel tank, covering material and paint. You know, the usual things that you have laying around the house.

The kit number for ordering a Miniplane is #RC-38. It's intended for .40-.46 engines but I'm certain it would fly on a good .35. Many speed freaks will undoubtedly try to stuff a hot .60 under the cowl but it's really not necessary for anything but pure speed. The span of the Miniplane is a small 44" and the total area is 650 sq. inches. The fuselage measures 40 3/4" long. All up weight should be between 5-5 1/2 lbs. In fact, one would have to incorporate very sloppy building techniques to get the weight up over 6 lbs. Before we get into the building mechanics of the Miniplane, let me remind you that this is a contest proven design that can win in the

PHOTOGRAPHY: FRANK TIANO

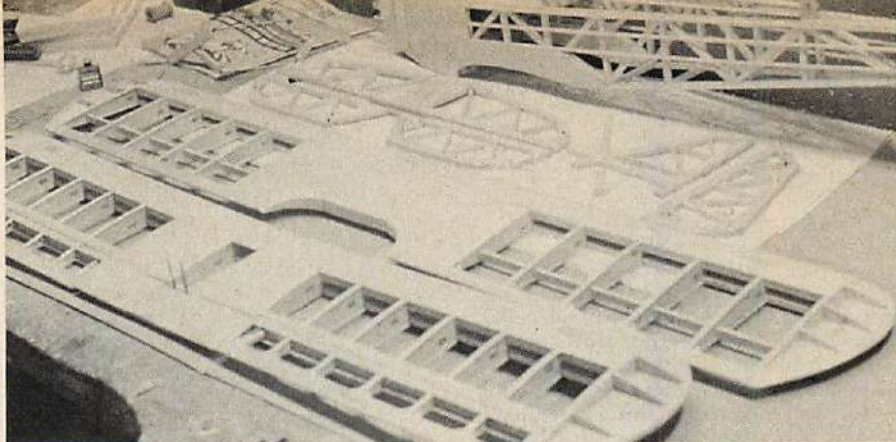




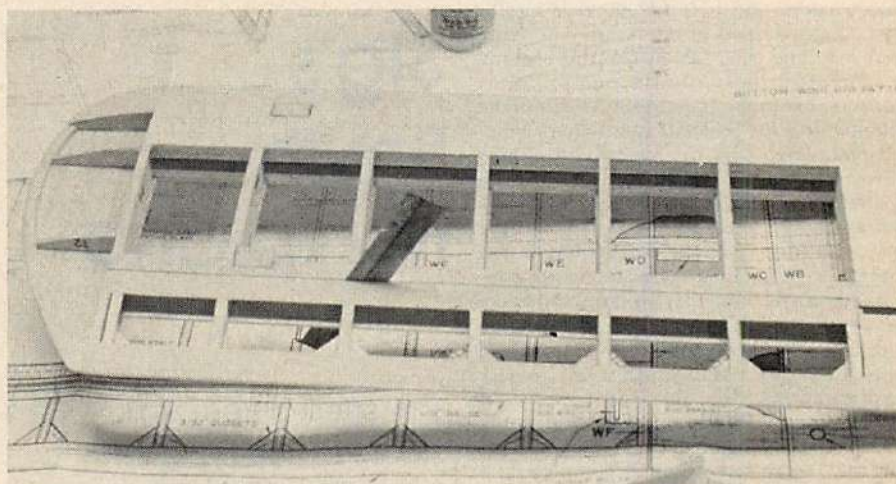
hands of a competent flyer. The ship placed first in the 1976 National Multiwing Championships at Omaha and 1st at the Canadian Nationals in 76.

## Fuselage

The fuselage, like the rest of the Mini-plane, is constructed primarily of balsa. Two fuselage sides are built from a  $\frac{1}{4}$ " balsa double and wing saddle and a bunch of  $\frac{1}{4}$ " sq. spars. In other words it's like building an old time stick model only easier. With the exceptions of areas requiring additional strength, all construction was done with Hot Stuff. The upright  $\frac{1}{4}$ " sq. members were also treated with a diluted solution of Pica Ind. Glu-it. This insures that they would not separate from the main fuselage frame during a hard landing. The completed fuselage sides are brought together with  $\frac{1}{4}$ " sq. cross braces and a  $\frac{1}{4}$ " plywood firewall made from laminating two  $\frac{1}{8}$ " plywood bulkheads. The rear of the fuselage sides are brought together and glued and the basic assembly is completed. Quarter bulkheads are Hot Stuffed to the forward fuselage and sheeted with  $\frac{1}{8}$ " balsa. The rear formers are topped with  $\frac{1}{8}$ " sq. stringers and later covered with covering material. The forward bottom of the fuselage has provisions for the landing gear blocks which are tied in with some hard balsa for strength. It might be a good idea to reinforce this area from the inside of the fuselage with some triangle stock to further strengthen the gear blocks. I did this and the mounting blocks have never come loose even in adverse conditions. The aluminum motor mounts furnished in the kit should be side mounted and fastened with blind nuts. Proper holes for corresponding fuel lines and throttle cable should be drilled at this time also. The landing gear wires and cabane struts must be soldered together and may be installed now. Amazingly enough, the wheel pants need only to be Hot Stuffed together for a strong bond. The plastic will fail before the Hot Stuffed joint will. After a few flights from a grassy field the struts tend to bend back towards the trailing edge of the wing and the wheel pants will start to crack at the area of which they are mounted. I finally replaced both the wire struts and the pants after only 7 flights. The best solution for the problem seems to be a Bridi or Halco type landing gear with Cass Engineering glass wheel pants. The aluminum gear can be found with the same dimensions as the original wire gear thus the height of the airplane doesn't change. The Cass Engineering fiberglass pants are the same type he offers for the Pulsar and are a good value at \$10.95 if wheel pants are desired. The gear in my ship was replaced with a Bridi unit which features the same dimensions of the stock gear in both height and spread. Another alteration was made during the building process and this involved changing the stock ABS cowl to a fiberglass unit offered by Scale Model Products, 15 Newcomb Trail, Lake Panamuka, N.Y. 11961. This glass cowl has yet to show any signs of fatigue even after a few noseovers and general hard use. The attachment holes have not become elongated as they will with a plastic unit and the difference in weight is only 1 oz. The cowl retails for \$11.95 and I strongly suggest one for anyone seriously interested in competition. Later on weight will have to be added to the nose and the fiberglass makes a much sturdier platform than the



The total weight of the framed out components (above) including wings, fuse and tail surfaces is only 26 ounces. The ailerons are cut from the bottom wing with a hobby saw (below). They are very large.



ABS. With the exception of a couple of balsa blocks that sandwich the fin, the fuselage is basically completed.

## Wings

With the exception of the hardwood pieces I used Hot Stuff for the entire wing construction. Both the top and bottom wings are built in the same way but the top wing has no dihedral and is constructed in three sections because it is swept back somewhat. The bottom wing has a little dihedral but is built straight. The ailerons are cut out of the bottom wing whereas the top wing has no ailerons. One set of ailerons has proved to be more than effective so no modifications should be made here. The wings are built with conventional methods by placing the ribs down over the bottom spars and then cementing in place the top spar, leading and trailing edges. The center sections of both wings are sheeted with  $\frac{1}{16}$ " sheet balsa as well as the leading edges back to the first spar. After adding the built up wingtips, the wings should be thoroughly sanded to final shape. The ailerons are cut from the bottom wing panels and the openings faced with  $\frac{1}{8}$ " sheet balsa. An Exacto saw blade with the firm, ribbed edge removed proved to be an excellent tool for cutting the ailerons from the rest of the wing structure without crunching any parts. Small plywood plates are cemented to the sides of four ribs to form a mount for the wing struts but experience has shown that these plates should extend across two ribs for additional strength. The small plywood squares just don't have

enough gluing area to remain strong. All wing ribs that are not covered with sheeting receive a  $\frac{1}{16}$  x  $\frac{3}{16}$  cap strip. Two hardwood plates are epoxied onto the bottom surface of the top wing to form a cabane strut mount and the proper holes drilled and tapped. The bottom wing must have some hard balsa blocks installed to form an area for the wing bolts to go through.

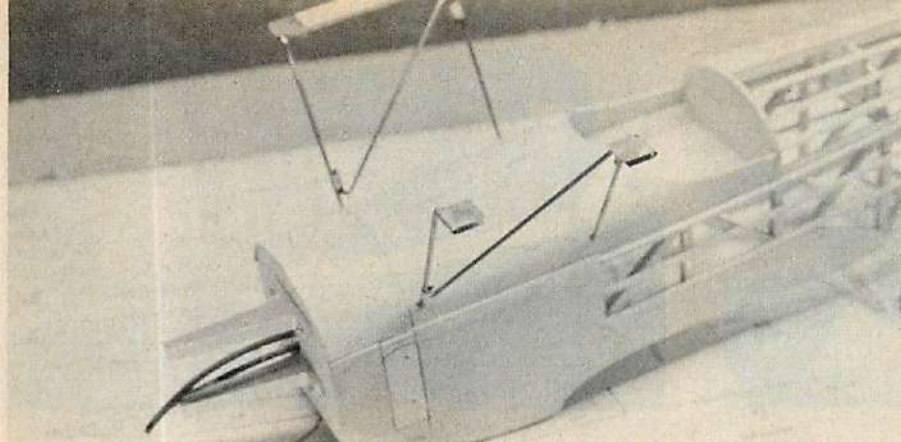
## Tail surfaces

There really isn't much to say for constructing the tail surfaces since they are simply built from a leading and trailing edge and a few  $\frac{1}{8}$  x  $\frac{1}{4}$  sheet ribs. These ribs are simple rectangle affairs and have no true airfoil. They may be constructed entirely with Hot Stuff and are then sanded to a blunt shape before covering. Only the corners are sanded with a slight radius on the leading and trailing edges. Do not make a sharp leading edge because this will change the flying characteristics of the airplane. The two elevator halves are joined with a  $\frac{1}{4}$ " dowel. It has proven to be best to cover the stab and fin and cement them to the fuselage before installing the rear fuselage blocks. Just be sure that everything is square before permanently mounting them in place.

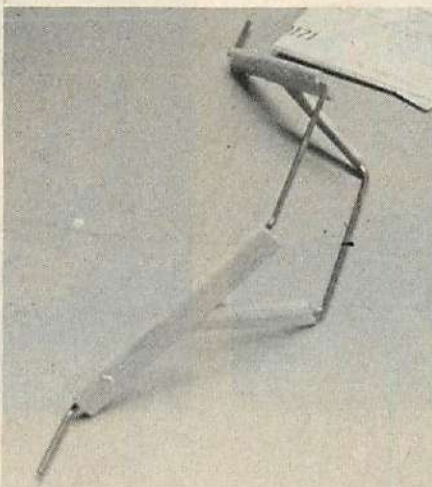
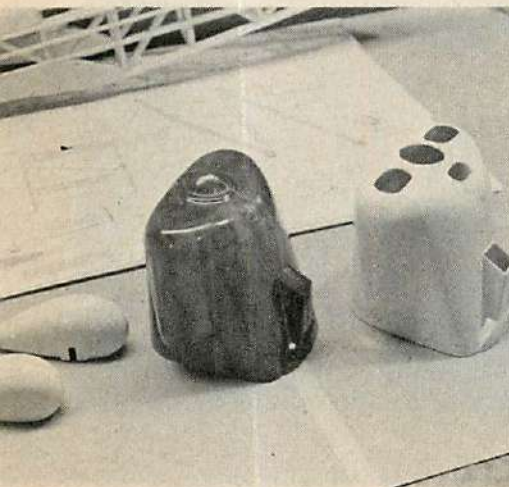
## Finishing

Well, even though I said that I'd never use the stuff again, the entire ship was covered with Permagloss Coverite. Super Coverite has long been my favorite covering material but I just could never get it goether with the Permagloss. This time I took the time to





The cabanes are installed on the fuselage after the top sheeting is glued in place (above). Darker cowl is from Scale Model Products the white one is from Sig. Gear must be soldered and have fairings added.



contact Coverite and tell them of my problem and they responded by telling me the proper way to adhere the covering to balsa wood. Boy, was I surprised when I found out that I had been applying the wrong amount of heat and using the iron in the wrong way. They explained to me that Permagloss has been vastly improved and that with proper heating temperatures the stuff will provide a very strong, durable, pre-painted covering. After using white Permagloss on the Miniplane I discovered that he was absolutely right. The secret is lotsa heat. In fact, the iron must be turned up way past its normal operating temperature. To do this I simply removed the knob and reset the set screw in a clockwise motion to override the rheostat. Some irons may differ in the way this is done but it can be done with all of them. Next, the sealing iron is used in a pushing attitude. In other words, it is pressed on the fabric, not dragged across it as would be done with plastic iron-on products. A full 3 seconds of heat must be applied for the Permagloss to stick properly. If the iron is dragged across the surface of the material, there is not enough time for sufficient heat buildup to adhere the adhesive coated side. Granted this is a more time consuming process but it's the only method that really works and the final results are well worth it. By heating the material in sections, a beautiful white, fuel proof, dent-resistant finish resulted that also added to the structural integrity of the airplane.

After finishing the covering job I decided to paint the scale sunburst scheme on with

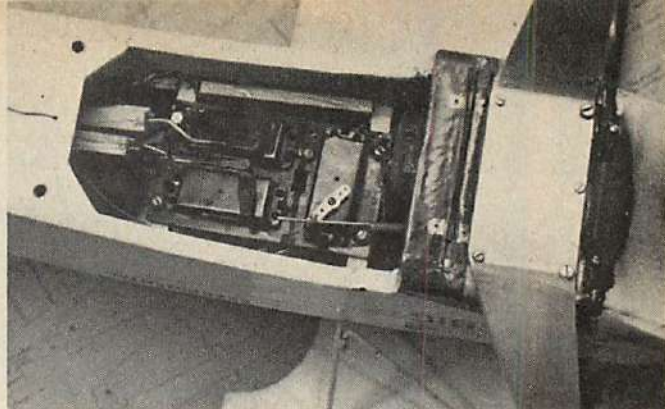
red RS Perfect paint. I quickly discovered that to sunburst the top and bottom of both wings would take me almost forever and therefore decided to do my own style paint job especially since I wasn't planning on entering the ship in stand-off scale competition. The Perfect red was applied from a regular spray can. All black striping was done with DJ's tape. The kit decals were applied and all water squeegeed out from underneath them. Once the decals had thoroughly dried, I sprayed on two coats of Perfect high gloss clear, again directly from their spray cans. A day later the finish looked really super and I knew from experience that it was totally fuel proof. Some sort of cockpit coaming and a windshield should have been added at that time but I completely forgot and to this day I haven't added them but the Smith doesn't seem to mind and neither do I since I've been having so much fun with the ship. My only regret is not doing the scale paint scheme because then I could have entered it in stand-off scale. I never really believed it would perform as well as it does, hence the original scheme. However, the ship will compete in the biplane events and will still receive the 10% bonus for being a model of a real airplane. For those of you contemplating campaigning a Miniplane on the contest circuit, Sig offers a photo-pak of Glen Sig's full scale Miniplane. The photo-pak contains 10 views of Glen's ship in living color for only \$4.00 postpaid. These should be a must for documentation purposes for the serious competitor.

## Engine/Radio

As it turns out, with the exception of Sig, MRC located in Edison, New Jersey, is solely responsible for the way my Miniplane handles. I chose to power it with MRC's Webra Speed .40 and control it with their 775 system. The Webra Speed .40 is one of the most powerful engines of its size available today from anyone. It's a design from Peter Billes, the same designer that gave us the HP .40, hence the similarity in appearance. The .40 Speed is very similar to the Webra Speed .61 with the exception of a removeable front end. Both engines share the same muffler in fact. The engine is one of the heaviest .40's around, tipping my scale at an incredible 17 ounces with muffler. However, any extra weight is more than made up for by this unit's tremendous power output. Webra claims that a maximum output of 1 horsepower may be achieved without muffler, on 10% fuel, swinging a 9 x 6 Zinger type prop. I believe these figures because we achieved readings on the Royal tach of 16,000 with a 10 x 5 Zinger with a Semco exhaust manifold fitted with a pressure tap. Changing to a more flyable 10 x 6 Zinger, the revs came down to 15,000. That's still turning up pretty good. The carb fitted on the Webra Speed .40 is a two needle type that offers individual settings of both high and low ends. The settings may be a bit hard to come by with a new engine but the end results are worth the bother because once the carb has been set, you're all done. No further tinkering should be necessary unless the weather has changed to a very humid condition. The Semco exhaust manifold, if fitted with a pressure fitting, will provide enough back pressure for a good idle, about 2,200 r.p.m. Regardless of what type muffler arrangement you decide to use be sure that you provide pressure because this engine will just not run properly without it. Semco's Pitts Jr. muffler will not fit no matter how hard you try to alter the aircraft. For those of you interested, this .40 will turn some larger props at startling r.p.m. figures. For instance, we tried an 11 x 6 Zinger and found the Webra to flip it around at a shade under 12,000. A 12 x 5 almost managed 11,000. Those are pretty respectable figures from a speedy type engine. With the needle valve set at a slight rich setting the Webra pulled the Miniplane through all vertical maneuvers with ease. As long as we didn't over tweak it, it never sagged during any of these maneuvers.

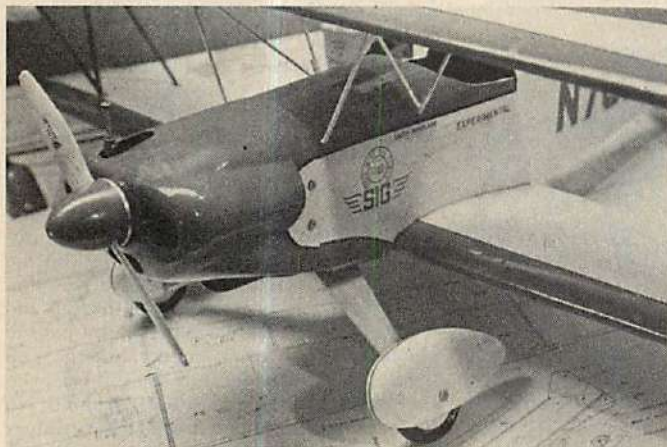
The MRC 775 radio was the same unit that I had installed in the Heinkel biplane that I had flown at the Rhinebeck Classics contest back in June of 1977. I gave a pretty comprehensive evaluation of the radio at that time but for those that didn't get a chance to read it let me quote myself from the MRC catalog somewhat. In easy to understand terms, the 775 transmitter features two, all metal, open gimbal stick assemblies with no play around neutral. The stick itself has no plastic parts to eventually wear out or become deteriorated. Also featured on the sticks are balanced finger grips for more precise movement. All trim levers have a feature that other radios should have; detent type movements featuring 22 different, separate detents for each lever. In other words, when you want a tad of down trim, that's what you get. You can actually feel the different clicks as you move the different trim levers. All stick functions and their respect-





The Webra .40 Speed is shown installed (above) a powerhouse that really makes the Miniplane perform up to its capabilities. The shot (below) shows

the Bridi gear and Cass Engineering wheel pants. MRC's 775 radio (above) fits nicely in the fuse. Frank (below) with radio and Sig Smith Miniplane.



ive trims have sealed plastic conductive pots. That means eight pots, one for elevator control, one for elevator trim, etc. You may have realized that by using this type of arrangement, there is little or no chance of ever getting dirt or debris into the pots. Smooth operation is achieved primarily because all the pots are supported in their own bearings to avoid any play or friction. As I said once before, this radio retailing at \$349.95 will compete successfully with other name brands selling for a couple of hundred bucks more. It's that good.

### Flying

Before taking the ship out for the first flight, I listened to my friend Bob Curry and changed the balance point by moving it  $\frac{3}{4}$ " forward. Bobby had learned from someone at one of the contests that the c.g. as shown on the plans would result in one very tail-heavy airplane. Since that's the last thing I wanted, I wisely moved everything forward and added about 6 oz. of weight to the cowl. The plane balanced perfectly at the new location and I strongly recommend that you balance yours there too if you expect to bring the ship home after the first flight. I say this regardless of what you may have read in any other publication.

A five m.p.h. wind was blowing on that Sunday afternoon, a beautiful day for test flying. Another friend, Tom Clemente, spent a considerable amount of time in helping set up the Webra so it would perform right while cowed in. I have never changed those original settings. Armed with my Minolta 35mm camera, I asked Tom if he would mind making the first flight so I could get the necessary pictures for the article. He

readily agreed and in a flash the Miniplane was at the North end of the field in preparation for takeoff. Tom advanced the throttle quickly and the Smith rolled about 50 feet before it literally jumped into the air. Initially the ship needed lots of down trim to fly hands off but there was more than enough on the transmitter available to bring it back so we could make the necessary adjustments. We refueled the 10 ounce tank and flew it one more time. This time the ship behaved beautifully and we knew we had a winner on our hands. After shooting about 20 pictures, Tom brought the little ship back home to roost and I got it ready for my first flight. The Miniplane handles very well on the ground and requires just a bit of right rudder during takeoff. By holding in a little down stick you can keep her on the ground as long as you like before letting her lift off. The ship is so quick and stable that one could actually loop or roll it on takeoff. The Webra .40 provides plenty of power for the little biplane and I wouldn't recommend anything stronger. (If there is anything stronger.) I have all controls set up for maximum throw and that's the way I prefer to fly. Others who have flown the Smith say that it's a little sensitive, although stable. If you want to zoom around a lot, go for the larger throws, it's more fun! Rolls to the right are a bit faster than those to the left and the same goes for the spins. They are quick in both directions though. Loops may be done tightly or very big and open. The ship tracks true through both types. A good indication that we had achieved a proper balance point was shown by the addition of down trim as the fuel was burned up. Jabbing at the elevator will produce some of the neatest square loops you've ever seen

and all snap maneuvers happen "right now" and the ship will come out on heading with a little practice. It's the closest reacting airplane to a Pulsar that I've flown to date. A surprising plus is that in a dead stick situation this plane will glide very well, many times reaching the landing area when some pattern ships wouldn't have. Landings as well as touch and go's are easy to execute because the Miniplane sets up a very predictable sink rate. Blasting to full throttle after a touch and go does not result in any snapping tendencies. The ship flies inverted almost as well as it does upright which is very unusual for a biplane with a semi-symmetrical airfoil that is almost a flat bottom type. I think we tried almost all of the AMA pattern maneuvers and found that the Smith can execute them all in the hands of a competent pilot. I'd love to see one perform with Norm Cassella at the sticks.

### Conclusion

To wrap it all up, I have to say that this airplane is one of the sweetest, smoothest ships around. It's ideal for fun fly or serious competition. It will turn on a dime or land on one as well. It has provided me and a few of my friends with countless hours of pure enjoyment. The design incorporates some very rugged construction into a very light airframe. The total weight of my Miniplane, after ballast, was 5 lbs. 3 oz. ready to fly minus fuel. The Webra Speed .40 and the MRC 775 radio are ideally suited to the ship but, as I said, any good .40 should provide close to the same results. If you're looking for a plane to scream around the sky with, this kit may be for you. As for myself, all I can say is *Move over Pitts*.



# EK-Logictrol's Nimbus Sport R/C System

This past year EK Products added a new economy line to their inventory of R/C systems and equipment. The new system is designated as the Nimbus Sport (2-4). I should qualify the use of the word economy. I'm certainly not implying cheap or even bottom of the line. The Nimbus Sport has simply been established as a high production system which is offered with a minimum of options. By limiting the options or choices, a savings results which in turn is passed on to the modeler. The suggested list price of the EK Products Nimbus Sport system is \$295.00. In reality the system is being sold at substantial discount prices making it very competitive with several other popular "Sport Series" systems now on the market.

As received the Nimbus Sport (2-4) consists of the following items: a four channel transmitter, receiver, four servos, an airborne battery pack with switch harness, full

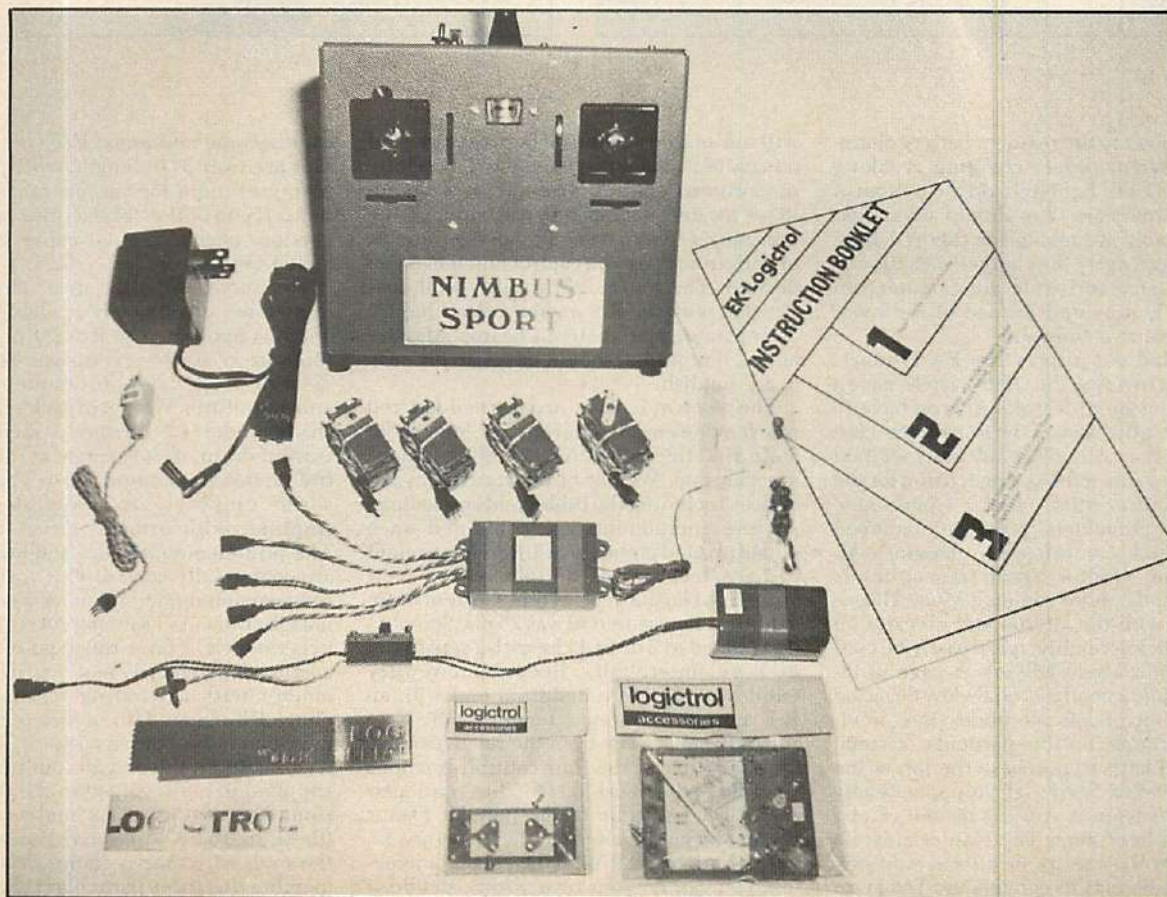
A fine four channel system that you can purchase at an appealing price/**Bob Aberle**

PHOTOGRAPHY: BOB ABERLE

nickel-cadmium rechargeable batteries (both receiver and transmitter), battery charger, UM-11 Uni-Mount (mounts three servos and the switch), AM-4 Aileron Servo Mount, an assortment of servo output arms and wheels, frequency flag and an operating manual. The Nimbus Sport system is only available in the dual stick transmitter configuration and only on the 72 mhz R/C frequencies.

Now let's discuss the Nimbus Sport sys-

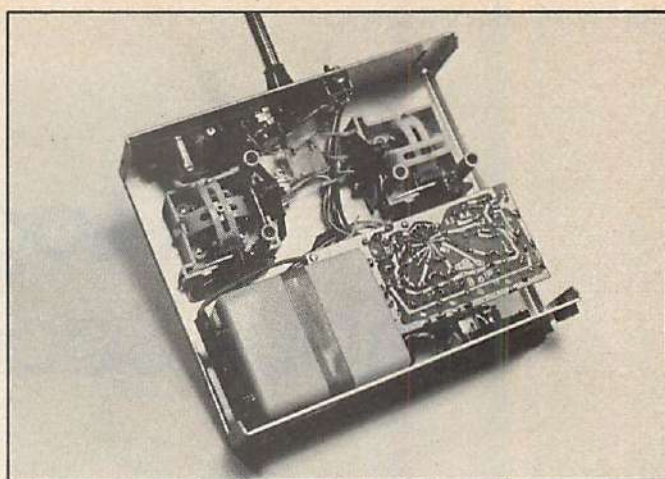
tem in detail. The transmitter is housed in a red vinyl covered aluminum case measuring 7½" high x 6¾" wide x 2½" deep and weighing approximately 1¾ pounds. The retractable whip antenna extends to 40 inches when in use. Total current drain (on my particular transmitter) was 100 ma. (milliamperes). Battery power is supplied by eight nickel-cadmium rechargeable cells (AA size rated at 500 mah) connected in series for 9.6 volts (nominal). The battery cells are contained within a special molded nylon case with external snap connectors. As such the entire battery can be easily removed for special testing or replacement should it become necessary. A series type battery charger is employed. This means that both battery packs are normally charged together. To charge you simply plug the transformer type charger cable into a receptacle on the bottom of the transmitter case. Then run a sec-



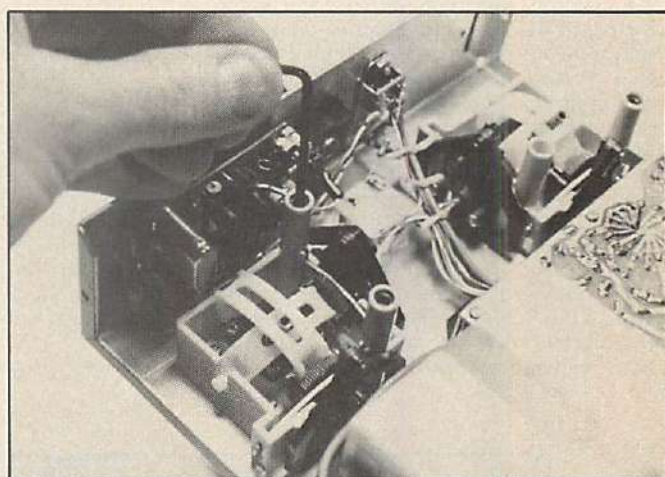
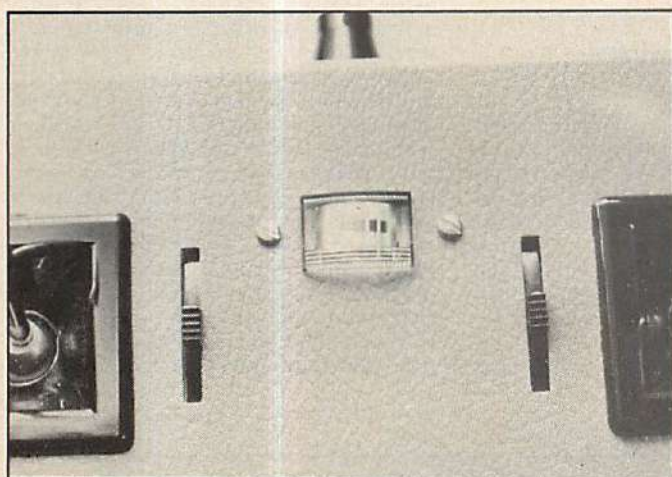




Typical charging hook-up, both together in this series circuit. 14 hours is suggested. LED light lets you know it's happening. **Below:** Close up of EK's voltmeter (on the transmitter). Not expanded scale, seen in "on" condition.



Inside the transmitter. R-F board upper left, encoder P/C board lower right. Eight 500 mah nickel cads packed inside a nylon case with snap connections. **Beneath:** Transmitter stick tension adjustment. Adjust to your liking.



ond cable over to the receiver battery charging jack. When proper charging is taking place a LED will light (red) on the bottom of the transmitter case. You should always get into the habit of looking for this red light *after* connecting up the charger each time. A voltmeter (standard scale not expanded in this case) is provided instead of the more usual R-F output indicator.

As pointed out in previous EK Products equipment reviews, the control sticks have a unique adjustment feature. All you have to do is remove the back of the transmitter case cover, insert an Allen Wrench at a specified location and adjust the spring tension for the desired control stick "feel". Conductive plastic potentiometers (pots) are employed on each stick control (each channel). Although the Nimbus Sport transmitter is supplied in the more common Mode II configuration with the aileron and elevator on the right stick assembly, it can easily be converted to suit Mode I flyers. A page of instructions and a good pictorial view describe this easy conversion. No buddy box provision is available on this particular system. You would have to purchase the top of the line, Super-Pro Series, if you specifically desired this feature. A fifth channel can be added at a later time. The system must be returned to the factory or a local warranty service center for this conversion. Total cost

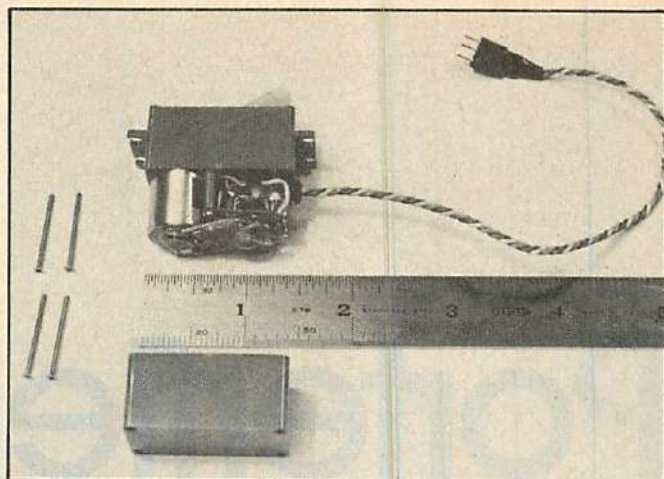
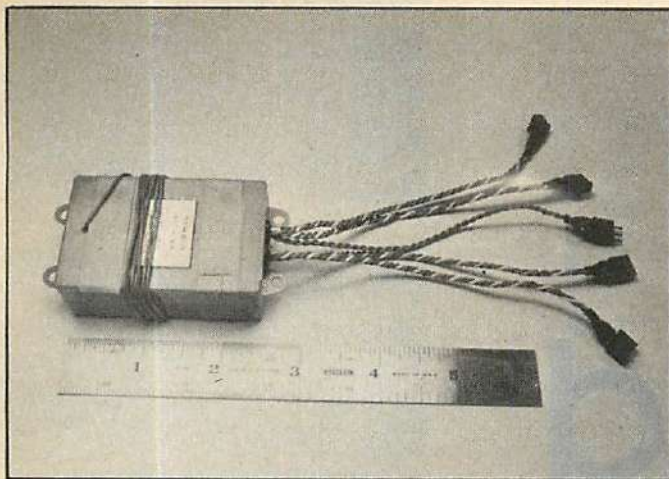
will run around \$35.00 (for both receiver and transmitter). The fifth channel will be a fully proportional control operated by a thumb lever located on the top, left side, of the transmitter case. You could operate retracts or flaps from this extra control function if you desired. The transmitter itself is well constructed with the R-F and encoder circuitry on separate printed circuit boards. Maintenance, if required, should be relatively easy to accomplish.

The receiver is contained in a molded (red color) nylon case measuring  $2\frac{1}{2}$ " long x  $1\frac{3}{8}$ " wide x  $\frac{7}{8}$ " thick plus  $\frac{5}{16}$ " mounting flanges on each end. Weight of the receiver is 2.0 ounces including the cables and connectors. All the components are contained on a single printed circuit board. Servicing ought to be a technicians delight with a well spaced out layout such as this. Current drain at idle (as I measured it) was 25 ma. Selectivity is stated as 3 db at 4 khz with a sensitivity of 1 uv (microvolt). Receiver circuitry employs a double tuned front end with an R-F amplifier. Antenna length is 38". Five separate cables exit from the receiver case. One for each of the four control functions plus the power cable. On this particular series EK has gone to the popular Deans three pin gold plated connectors (my favorite I might add). With the Deans connectors you can do your own wiring should it

ever become necessary. Each of the five cables are over 5" in length, which gives you plenty of room for various model installations. If you option for the fifth channel conversion, one additional cable set will be added to the receiver.

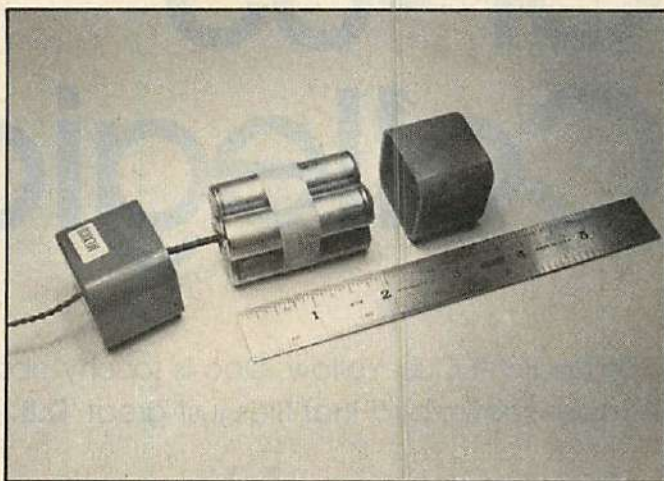
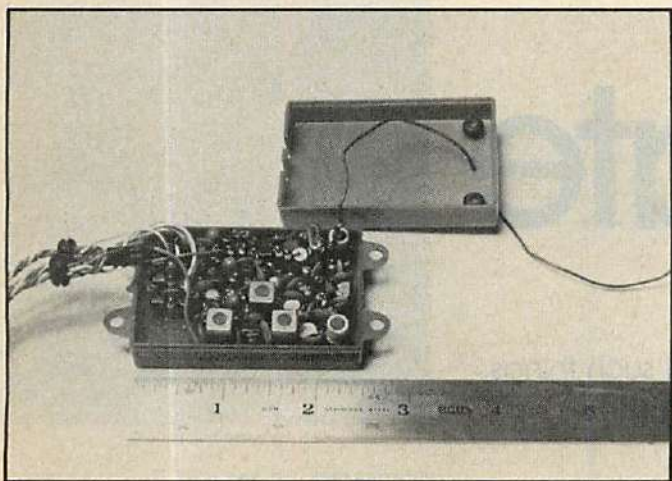
The servos supplied as a standard item (remember no choice is available) with the Nimbus Sport are the EK-SM or subminiature variety. Each servo measures  $1\frac{3}{8}$ " long x  $\frac{3}{4}$ " wide x  $1\frac{1}{8}$ " high plus mounting flanges and output arm. Weight of each servo is just a shade under 1.2 ounces. I measured the current drain of each servo, at idle (no control motion), at around 7 ma. The little SM servo employs an integrated circuit amplifier with external driver transistors. The printed circuit board and motor wiring are conformally coated. This is intended to reduce component fatigue caused by external vibration. As I said in previous EK Products reviews, I favor this type of protective coating. The electric motor is 16 mm in diameter with a winding resistance of 11 ohms. EK claims 1.45 in.-lbs. of torque and over 4 pounds of thrust with a 1% resolution. As a matter of interest all four of the servos supplied to me revolved in the same direction. Deans three pin male connectors (these are three wire servos) are attached to the ends of 6" servo cables. You must remember that these particular Deans connectors





The receiver all assembled. Individual cables employ the very popular Deans three-pin gold-plated connectors. **Photo below:** Discrete receiver components on well designed circuit board. A 5th channel can be added later.

EK-SM servo is an I.C. type with a three wire cable system. Amplifiers are contained within each servo, 1.2 ounces each. **Beneath:** Four 500 mah nickel cad cells in molded nylon case. Lighter 225 mah battery pack is an option.



tors will not interface with the normal EK Products (subminiature type) connectors supplied on their other systems. If you already own another EK system it is more than likely that the servos cannot be interchanged unless the connectors themselves are changed over. The operations manual contains a detailed pictorial view of the SM servo showing each part and its identification number. With a diagram such as this a modeler could easily perform his own mechanical servo maintenance (gear replacement, for example).

Airborne battery power is supplied by four, nickel-cadmium rechargeable cells (AA size rated at 500 mah) connected in series for 4.8 volts (nominal). The pack is housed in a molded nylon case measuring 2 1/2" long x 1 1/4" square. The power switch and charging jack are an integral part of the battery pack. The charging jack itself can be mounted to the fuselage side or bulkhead for additional convenience. Complete battery recharging takes 14 hours at a rate of 45 ma. The combination of the battery, switch and jack weighs 4.3 ounces. An optional 225 mah battery pack could be purchased separately at a later time. This smaller pack (of less capacity) would save approximately 1.8 ounces of weight if that were a critical factor for the particular model design. 1/2A R/C flyers would be most interested in this op-

tion.

For those interested the total airborne weight of the Nimbus four channel system with four SM servos and the 500 mah battery is a very respectable 11.1 ounces. Two channel weight (only two servos) using the 500 mah battery would come to 8.7 ounces. Two channel weight with the optional 225 mah battery would further reduce the weight to 6.9 ounces. You must remember, however, that the 225 mah battery pack will only supply less than half the capacity of the larger 500 mah battery. EK indicates roughly 2 1/2 to 3 hours of flying time is possible on the larger pack. Be cautious when using the smaller battery pack since it will give much less flying time between recharges.

The general operating manual supplied with the system appears to be adequate enough. Frequency color codes are discussed and to my pleasure an FCC licence form is supplied along with a reprint of the FCC Part 95 Rules. Every R/C'er is supposed to have a copy of these rules in his/her possession at all times. The EK warrantee is 90 days for this particular system. Besides factory repair service a wide network of local service centers are located throughout the country.

As a matter of interest two other EK Products systems were reviewed in FLYING

MODELS during the past couple of years. The LRB-4 (brick style receiver plus two external servos) system was reviewed in the October 1975 issue. Additionally the Champion 2-5 system appeared in the August 1976 FLYING MODELS. Back issues of both of these magazines are available at our publisher's office (Carstens Publications, P.O. Box 700, Newton, New Jersey 07860).

A final comment concerns a recent conversation I had with, Bill Haga, EK Products Sales Manager. Bill indicated that another Nimbus system is now on the market. It is designated as the Nimbus-TWO and as the name implies is a two channel system. It features a single, two axis control stick on the transmitter. Dry batteries are used in both the transmitter and receiver. The receiver is the same physical size as the Nimbus-four (with less cables, of course). Two EK-SM servos are included in the system list price of \$129.95.

All in all I was pleased, for a third time in recent years, with what I saw in an EK Products system. I've flown many of these radios while helping local flyers check out new aircraft. The price of this particular Nimbus Sport system makes it attractive for both the R/C newcomer and as a second system for an experienced R/C pilot. Write to EK Products for their current catalog. Their address is 3322 Stovall Street, Irving, Texas 75061. ☐



# Porterfield CP-65 Collegiate

Don't paint it Cub Yellow, Doc is touchy about such things.  
A lesser known bird that flies just great/D.B. Mathews

**H**ave you ever noticed to the general public any model with a high wing, enclosed cabin, and a horizontal engine is automatically a Cub? Taylorcraft, Aeronca or Porterfield, red, blue or green; they are all Cubs. The more knowledgeable layman will even call the model a "Piper Cub" even though the original cub was a Taylorcraft. After many years of attempting to educate the spectators I've finally decided to give up. From now on I'll just smile and agree. When Dad says, "Son that there be a Piper Cub", don't expect me to correct him, for all I care the kid can figure maybe the old guy knows a little something after all. Nope, it's not my job man, no more hassle for me!

Therefore, this is a two inch to the foot model of a Porterfield Collegiate "Cub". It is finished in Cub white, trimmed in Cub red. This Cub uses a preformed plastic cowl from a Sig Liberty Sport, pants and aluminum gear from a Sig Citabria, and features a light-ply box fuselage. For those who know the difference between a Cub and a Collegiate I quickly add that although this model really doesn't look like a Cub, it *does* fly like one. It should, really, since the moments and airfoil are straight from Chuck Hollinger's drawings, first published in *Air Trails* 1954. The design has become a near classic as it is still kitted to this day by Sig (although structurally modified).

The objective of this project was to de-

velop a model more easily constructed than the Cub, while maintaining the same good stability and forgiving flight behavior. The resultant model is certainly different enough in appearance to avoid the Cub identity crisis and the flight characteristics have proven most highly satisfactory.

I will avoid the temptation to get into a long and detailed history of Ed Porterfield and his aircraft. If you are interested check a copy of *American Modeler*, August 1968 for an excellent article and drawings authored by Don Pratt. Just in passing I will mention two rather odd coincidences . . . The Collegiate was developed from the Wyndotte Pup built by the Aviation Club of Wyndotte High School (Kansas City, Kansas) in 1933-34. My wife taught school there in 1955-56. Second Odd-ball coincidence . . . I took my very first airplane ride in an Ercoupe piloted by Don Pratt. Now that is wierd.

## Construction

All references to glue in this article refer to aliphatic resins (Sig-Tite, etc.). The abbreviation C.A. refers to Cyano-acrilate, such as Hot Stuff, Jet, etc. Epoxy refers to the two-to-one types, *not* the five-minute kind. I would not recommend substitution of wood sizes, the structure is light enough and strong enough as drawn.

"Light Ply" is  $\frac{1}{8}$ " poplar plywood available from building suppliers, but also a cata-

PHOTOGRAPHY: D.B. MATHEWS









log item in the Sig line, and many hobby shops carry it. The cowl-pants-landing gear hardware are also standard catalog items your dealer can order for you using the parts numbers on the plans.

Finally, this is not a suitable model for the rank beginner at scratch building from plans. However, anyone who has successfully built and flown a kit trainer such as a Kadet or H-Ray should be able to construct and fly this design.

## The Fuselage

Since this portion is rather different and involves a relatively new material let's start here. Place a suitably sized piece of light-ply on the bench with two layers of carbon paper over it. One greasy side goes against the ply, the other against the plan. . . . this will give a reverse image with which to trace the opposite side. Trace over the plan outline using a pencil and a straight edge for all straight lines.

Cut the fuselage sides to the carbon marks. Most of the cutting can be done on a Dremel saw, the remainder will cut out nicely with a model knife. Save all scraps as they will be used later in the construction. Try to keep the pieces as large as possible by judicious planning.

Pin the two sides together and sand edges to match as closely as possible. Separate and add  $\frac{1}{8}$ " X  $\frac{1}{4}$ " cabin frames, former jigs, and gussets as per the plans. Keep reminding yourself to make a left and a right side. Taper left and right tail post joint and cut and install nose doublers. (Use contact cement, it avoids warping.) Be sure to leave a gap for bulkhead "B".

The formers can be traced onto thin paper or run off on a copier. Cut out to rough outline, spray with 3M Spraymount and stick to the wood. Trim carefully on the saw, drill

the needed holes, then peel the paper off. Simple! Trial fit bulkheads, trimming if necessary for a good snug fit. Position and epoxy to right side held flat on the building surface, then check alignment with triangles and a carpenter's square. Hold to plan with pins. Use clamps (spring clothespins are great) and masking tape to hold everything in place, adjusting until everything is square in all dimensions. Epoxy left side onto A, B and C, then allow the whole deal to set at least eight hours.

With the frame still on its side, block the right side of tail up at tail post so that its mid-line is exactly two inches off of surface. Secure block, apply glue and pull left tail post onto right. Check that curvature of sides is even and symmetrical. It can't be far off, but check. Now add top and bottom cross-grained sheeting, using C.A., then remove from building surface. Add undercarriage mount, hatch and hardware (if you plan on using a removable tank hatch), cowl sheeting, wing hold-down blocks  $\frac{1}{4}$ " X  $\frac{1}{2}$ " tail fillers etc.

Complete fuselage by sanding and smoothing, then give all exterior surfaces and tank area one coat of finishing resin. Allow to soak into wood, then wipe off excess with a roll of toilet tissue.

## Landing Gear

The aluminum Citabria gear provides a sturdy and simple undercarriage with a good tread width. If desired a  $\frac{1}{8}$ " dia. music wire gear could be made up, but why bend wire needlessly? The pop riveted ply is novel, but it *does* work, I stripped the gear out of the fuselage bottom by hitting a concrete curb without so much as a crack in the plywood. I just epoxied the  $\frac{1}{4}$ " ply back into the fuselage and was back in business.

The tail wheel bracket may be primitive,

but it is most practical. If you'd like to get fancy, a C.B. Associated tail wheel unit would sure look slick.

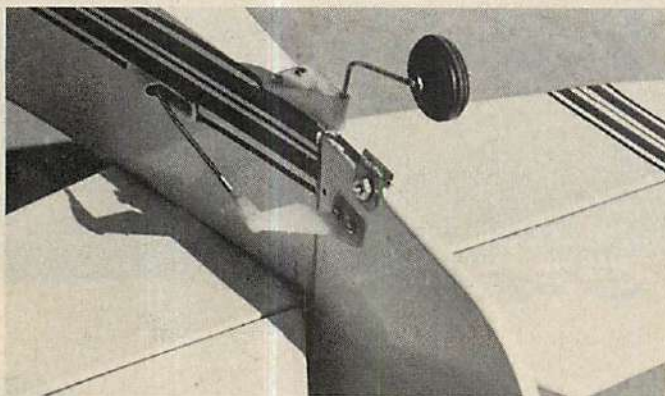
## Tail Feathers

Everything is built dead flat on the board over the plans. Note grain directions. I like to build to rough outline, then cut the true shape after removing from the surface. Hinge slots should be cut before sanding in the airfoil. The Collegiate surfaces were made of tubing so a half round border is scale. Cover sections before final hinging, it is much simpler.

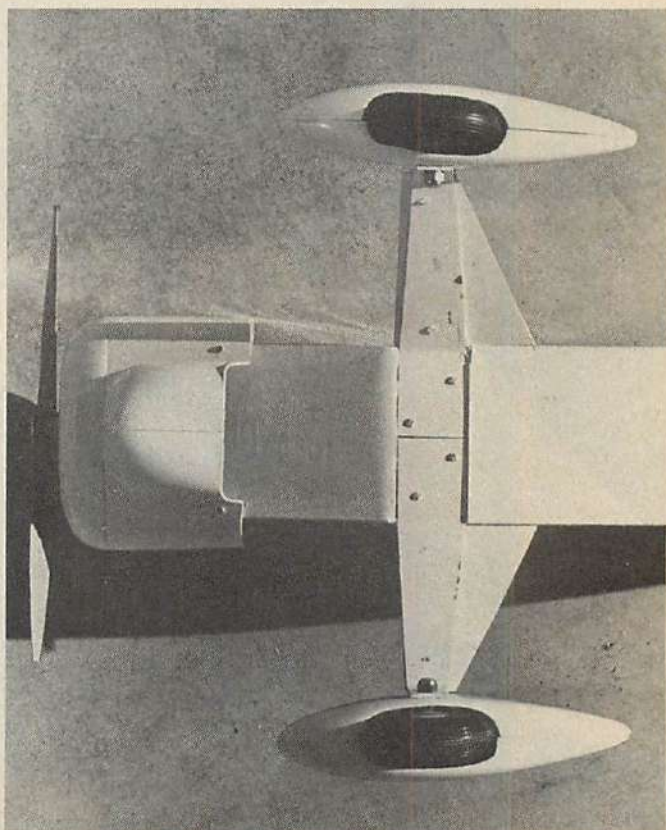
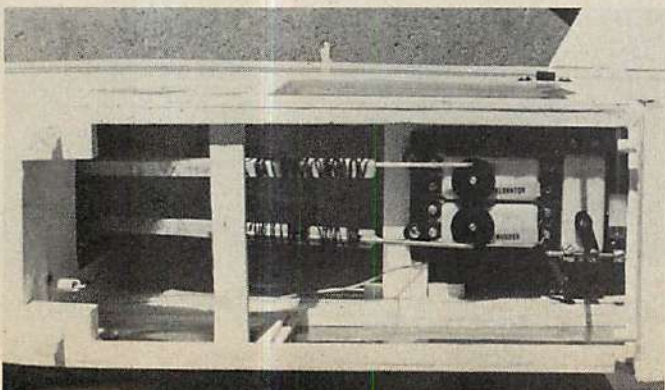
## Wings and Ailerons

Use the tracing paper (or copier) Spraymount technique to develop a wing tip pattern, dihedral gussets, and a plywood or metal master rib pattern. All ribs are identical really, with only the trailing edge cut off for W-3 ribs. Therefore, the ribs can be stack sawn to the rough outline, then sanded to match the master rib. *Do not forget the guide hole for the aileron pushrods!* The center-section ribs require a separate pattern and are cut out of  $\frac{1}{8}$ " lite ply. Just cut the nose off W-1 ribs for W-C ribs. Use a punch to widen the  $\frac{1}{16}$ " pushrod guide holes.

The wings are built flat on the plans, adding  $\frac{3}{8}$ " X  $\frac{3}{8}$ " leading edges last. Tips run from center of aileron spar to center of leading edge butting into the spars. Fillers are added to blend tips from W-3 into outside edges. Add all  $\frac{3}{32}$ " sheet gussets, scrap fillers, horn mounts, strut mounts (pre drilled) and other odds and ends, then remove from plans. Repeat the whole thing from an opposite side, the model will look much nicer with a right and a left wing. Add the  $\frac{1}{16}$ " planking, then sand in the dihedral angle using the classic table edge and sanding block technique.



The linkage. It's a wonder we don't call pushrods mechanical tendons. Small tailwheel pivots in bracket, swings with rudder movement for your steering. Below and right: Room to spare for your system, the simple and sturdy gear.





The center-section is constructed by first developing a carbon paper tracing onto the  $\frac{1}{16}$ " ply bottom, then building onto it. Spars and wing dihedral gussets are epoxied onto the ply, while the ribs are glued. Assemble each wing panel to center-section by sliding it onto gussets while the tip is blocked up  $1\frac{1}{2}$  inches. Epoxy gussets onto spars and wing rib slots. Hold gussets to spars with clothespins while epoxy cures. The ailerons are cut away from wings, then slotted for hinges. Trim front spar to taper shown on plans. Try to hinge as tightly as free movement will allow as a small gap is much more efficient aerodynamically.

### Wing Hold-Downs

Position wing onto fuselage top, check carefully for alignment, then mark trailing edge with a pencil from inside through hole in threaded block. Remove wing and drill trailing edge for  $\frac{1}{4}$ " nylon bolt passage. Return wing to fuselage and bolt to place. Clamp against former B and drill through them for  $\frac{3}{16}$ " dia. dowels. Try to keep holes parallel to each other by using a short scrap of dowel in first hole as a drilling guide for the second. The narrow gap at the wing rail can be easily filled with Epoxylite using Saran Wrap to protect B.

Fill cabin top with scrap block balsa and epoxy around projecting dowels, then remove wing leaving dowels in cabin top. Build center-section up to fit aileron servo, install hardware (I used a Goldberg aileron coupler unit). Check freedom adjusting for absolutely no bind anywhere. Use horn holes that will provide  $\frac{3}{16}$ " of deflection up and down. Cover center-section top with  $\frac{1}{16}$ " sheet.

### Wing Struts and Connectors

Fabricate the wing struts from appropriate

sized spruce, using drawings for approximate length. Epoxy pushrod wires with wing and fuselage assembled; final adjustment can be obtained with clevis. Carve and sand struts to an airfoiled shape, and give each a coat of finishing resin.

### The Finish

The model in the photos was finished using R.S. Perfect urethane paint over polyester sheathing on the open areas and finishing resin on the wooden areas. The sheathing is available in fabric shops and sewing centers. It's silk like in appearance; that is, it has a definite grain. Do not mistake a woven material also referred to as polyester sheathing; the proper material has a definite grain direction when held up to the light and is applied very much like silk. I apply the sheathing wet, over a previously clear doped frame, using the exact techniques we've all used for years. The sheathing will shrink some as the water dries, but the true tightening is controlled with dope. I use enough clear butyrate dope to get the desired tightness, then finish out with Sig Lite Cote. Too much dope can actually cause the fabric to split, so go slow with the clear. The main attraction of the sheathing is its low cost and strength, along with quick filling tendencies. I buy mine for 75¢ a yard and usually need only four coats of dope. I find no major fault with the polyester sheathing, other than a tendency to over-tighten when too much butyrate is used.

The photo model has one coat of clear, with the same basic types of undercoatings as the epoxies. They can be used over butyrate dope if at least forty-eight hours of degassing is allowed. Following the directions on the product will produce a nice shiny finish with a minimal amount of effort. They have excellent fuel spill resistance and the

colors resist fading quite well. I recommend the polyester-polyurethane finishing technique.

The prototype was finished out using red and black vinyl trim tapes. The wing and tail numbers are stock Sig decals which stick to the Perfect paint surfaces quite well. The windshield and windows are the very last thing placed on the model. Cut to outline, trim for a good fit, and C.A. onto the wood. Some strain relief of the windshield can be obtained with a hair dryer. I used vinyl trim tape along the joints to hide them.

### Flying Notes

With a .35, my model requires short grass or a paved surface as the acceleration is slow. Generous amounts of rudder are needed until some speed is built up. As the tail begins to rise a gentle tap of up will break the model off the ground. Climb out is gentle and slow, *do not horse this one around*, its flight envelope is realistic and stately. If you tend towards "ham handedness" consider using a strong .40. Obtain some altitude, then try out the aileron and elevator response. Turns are mild with good lateral stability and the model will return to a level heading with little need for opposite aileron.

Landings can be stretched somewhat as the model tends to float and a burst of power will add a surprising amount of distance. Flair out at ground level for a feathery landing.

Well, there you have the information to enable you to build your own Porterfield Collegiate "Cub". If you feel compelled to attempt to educate the lay public about the obvious (to you) differences in light planes, go right ahead! I figure the difference between the products of Kansas City and Locke Haven must be an illusion anyway. ●







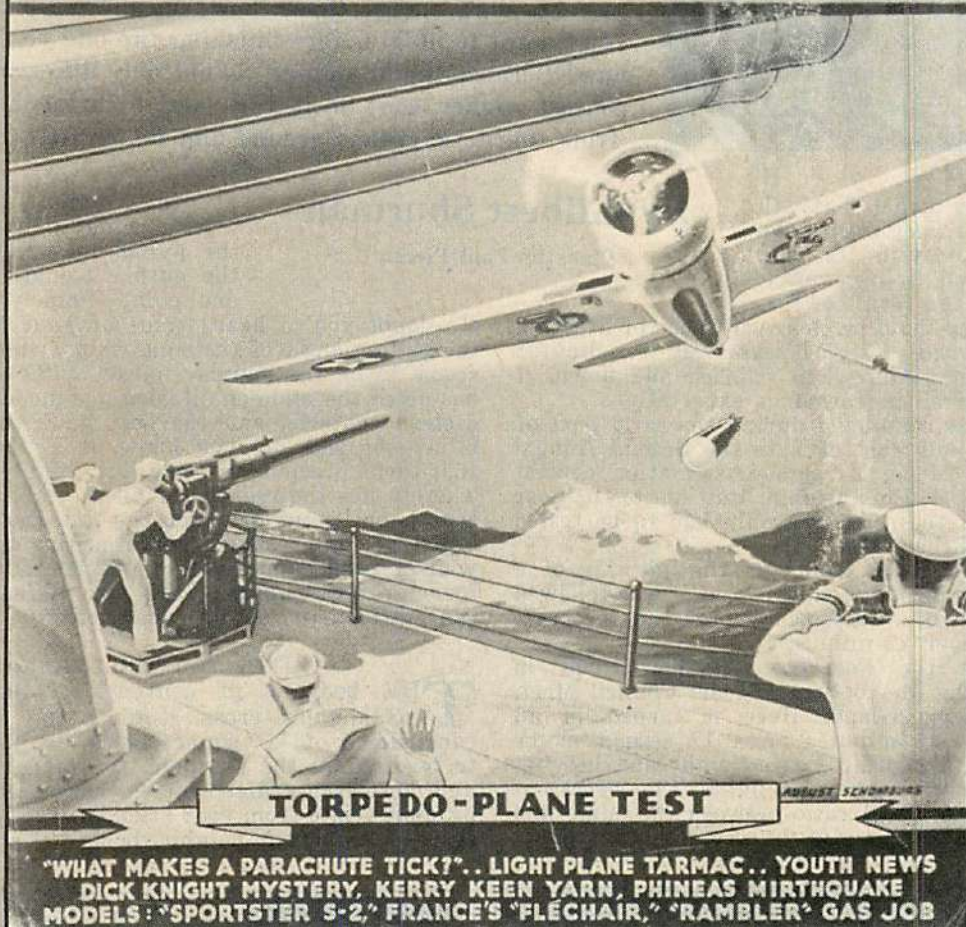


FICTION  
MODEL  
BUILDING  
FACT

THOSE 'FIRST 35' ARE THE HARDEST! See Page 6

# FLYING ACES

SEPTEMBER  
15¢



## TORPEDO-PLANE TEST

"WHAT MAKES A PARACHUTE TICK?"... LIGHT PLANE TARMAC... YOUTH NEWS  
DICK KNIGHT MYSTERY, KERRY KEEN YARN, PHINEAS MIRTHQUAKE  
MODELS: "SPORTSTER S-2," FRANCE'S "FLÉCHAIR," "RAMBLER" GAS JOB

1928-1978

fly  
models

50

FLYING  
ACES

This month's offering from the pages of *Flying Aces* comes from the September 1939 issue and is called the *Rambler*. This ship has a six-foot wingspan with tapered tip in a polyhedral configuration. While looking over the designs available to print in this issue we liked the *Rambler* but were a bit put off by the fact that we thought it would have to compete in the Old Timer category as opposed to Antique because of its date of publication (September 1939). As it turned out, in the text, as you'll read, the author, Gil Shurman, says that he entered the ship in a contest in Philadelphia in September 1938. It turns out that this is sufficient documented proof that the plane is eligible to fly in the Antique class under SAM rules.

We have been busy lately digging up people who contributed to the history of *FLYING MODELS* and *Flying Aces* and so far our search has been very successful. The conversations with all of these past editors and contributors have been extremely interesting and each one has something to offer in the way of reminiscences and good memories. We'll be putting all of this into our 50th anniversary issue along with some new articles written by the folks themselves.

So far the response to our January issue has been very good and we're pleased but we also want to hear from you as to what you would like to see and read, both from the pages of *Flying Aces* for nostalgias sake and in future issues of *FLYING MODELS*.

Watch for our announcement of the *FLYING MODELS* fabulous fiftieth anniversary oldtimers fly-in that you can enter here at our offices in New Jersey.



Here's Gil Shurman, designer of our "Rambler," testing the ship just before a contest at Creedmore, Long Island.



# "Rambler" Gasoliner

\*\*\*

All petrol pretties are not the same—no, not by a long shot! And here's one that's so much different that she stands alone. In fact, she's one of those "once in a life time" models that you'll want to build before finishing the one you're working on now! Because the "Rambler" is not only different—but she's a contest winner, too! So if you want to bring home the bacon from tourneys, gather around and follow Gil's instructions—

**H**ERE'S a gas model that will satisfy the beginner and expert alike with its ease of construction and flying ability. The *Rambler* was the result of several months of deep thought plus two weeks of drafting and building. It was designed expressly for limited engine run contests. And when finished and flown, it more than fulfilled all performance expectations.

The *Rambler* was completed during the early part of September, 1938, and was taken to the Second Annual Quaker City Gas Model Airplane Association contest at Northeast Airport, Philadelphia. But due to the poor weather preceding the meet, the ship had to be tested on the morning of the event.

Although testing a gas model on the morning of a meet is hardly recommended, in this case it was followed with a first place. On a 19 second motor run the craft stayed aloft for over 22 minutes!

The next time the *Rambler* was flown was in March, 1939, at the Metropolitan Model Council Meet, at Creedmore, Long Island. Here it turned in an unofficial flight of 16 minutes on a 17 second motor run. This time it disappeared from sight and has not been heard of since. On normal flights (no risers) it has always shown a 4-to-1 ratio between the climb and glide, which, under the present 20 second ruling, allows

By **Gilbert Shurman**

Plans by Paul Plecan

1½ to 2 minute average flights.

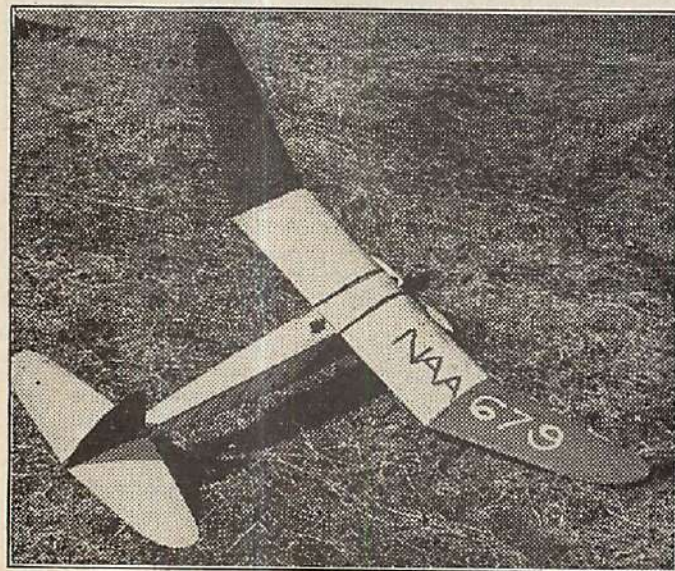
In concluding the description of the flying qualities of this model, the author would like to clear up one point—namely, sinking speed.

No doubt you've heard some of your friends describe the gliding angle of their gas ships, which in most cases seems to be the popular figure of 20-to-1. The author has noted the glide on all good gas models seen at recent eastern contests, and the best have shown a ratio of 6-to-1—or less. As you know, it is the sinking speed that turns precious altitude into minutes of flight time. Therein lies the reason for all the talk on S.S., because that is one point in which the *Rambler* excels.

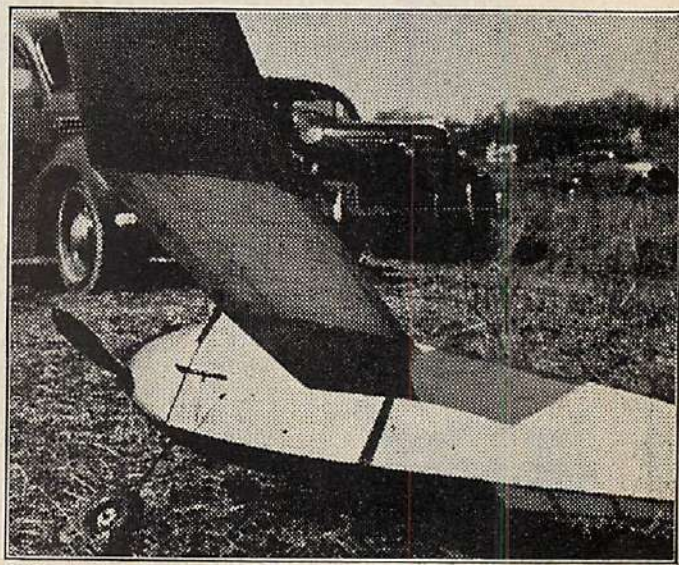
Are you interested in building this crate? Then grab your ol' pencil and dividers and get to work right away by enlarging the plans to full size. After that's done, you can start on the actual construction.

## FUSELAGE CONSTRUCTION

**T**HE body is of conventional design, having a rectangular cross section; the entire frame is constructed of ¼" square balsa. In picking the strips to be used in the fuselage, try to use the straightest and most even-grained pieces that you can beg, borrow, or appropriate from your friends, enemies, or other model builders in your neighborhood.



Now we have the "Rambler" gas buggy at ease after one of her long hops. In this shot, you can see how much tip dihedral she has, too—for good flying qualities and to keep the wingtips from being damaged when she comes in for landings. Instead of "digging in," she just comes to rest lightly on either one panel or the other.



This striking close up clearly brings out details of the under-side of the wing and the landing gear. And those straight cross-pieces on the bottom of the fuselage give you an idea how simple she'll be to build. Your "Rambler" will look just like this while you're at a contest waiting to be called for a flight by the judges!



## BILL OF MATERIALS

Twelve strips  $\frac{1}{4}$ " sq. by 5' hard balsa for longerons, cross braces, uprights, and leading edge of wing;  
Six strips  $\frac{1}{16}$ " by  $\frac{1}{4}$ " by 36" medium balsa for tail surface ribs;  
Four sheets  $\frac{1}{16}$ " by 3" by 36" medium balsa for wing ribs;  
Three sheets  $\frac{1}{8}$ " by 3" by 36" medium balsa for wing, rudder, and stabilizer outlines and wing mount;  
Three strips  $\frac{1}{8}$ " by  $\frac{3}{4}$ " by 36" medium balsa for trailing edges;  
Three strips  $\frac{1}{32}$ " by 2" by 36" soft balsa for wing leading-edge covering;  
Two strips  $\frac{1}{8}$ " by  $\frac{3}{4}$ " by 5' hard balsa for wing spars;  
One sheet 6" by 12" by  $\frac{1}{8}$ " plywood for firewall;  
One sheet 6" by 6" by  $\frac{1}{20}$ " plywood for wing spar joiners;

One sheet 6" by 6" by  $\frac{1}{16}$ " plywood for motor mount gussets;  
One strip  $\frac{3}{8}$ " by  $\frac{1}{2}$ " by 12" basswood for motor mount bearers;  
One strip  $\frac{1}{8}$ " sq. by 36" medium balsa for rib stiffeners in center section;  
One strip  $\frac{3}{16}$ " by  $\frac{1}{4}$ " by 36" for leading edge of tail surfaces;  
One strip  $\frac{1}{4}$ " by  $\frac{3}{4}$ " by 9" for the rudder base rib;  
One pair of  $3\frac{1}{4}$ " or  $3\frac{1}{2}$ " airwheels, one length of  $\frac{1}{8}$ " or  $\frac{3}{32}$ " steel wire for landing gear, one length of  $\frac{1}{16}$ " diameter steel wire for reinforcing rudder bottom, five sheets of bamboo paper, six feet of hook-up wire for ignition circuit, one foot of high-tension wire for spark coil to spark plug connection, one sheet of .020 spring brass for battery-box terminals, No. 1 machine nuts, dope, cement, and one good flight timer.

You will note, on the plans, that the fuselage is symmetrical, making it easy to build. The similarity in shape between the top and bottom longerons produces an equal strain, so when you remove the built frame from the plans, the fuselage will not change shape.

Since the fuselage is so simple, it is not necessary to explain fully its construction. Note, however, that the top of the fuselage is filled in directly behind the wing with sheet balsa, to provide a mounting for the timer. A piece of  $\frac{1}{4}$ " by  $\frac{1}{8}$ " pine goes through the fuselage at the front to provide a point of attachment for rubber bands that hold the engine mount on. Before laying the fuselage aside, examine all the cement joints and make sure that they are sufficiently strong.

The motor mount consists of two bearers,  $\frac{1}{2}$ " by  $\frac{3}{8}$ " by  $4\frac{7}{8}$ ", cemented and nailed with small brads to the plywood piece, "A," shown on the plans. Also nail on an upright piece of  $\frac{3}{8}$ " by  $\frac{1}{2}$ " at the rear of the triangular plywood piece. This upright is bolted to the  $\frac{1}{8}$ " plywood bulkhead.

Cut two 10" lengths of  $\frac{1}{4}$ " squares and cement a sheet bottom between them, making sure that the space between the  $\frac{1}{4}$ " squares is over  $1\frac{5}{16}$ " to allow for shifting of the battery box. After cutting out two pieces of "B," cement them to the  $\frac{1}{4}$ " squares. And when dry, glue the whole works to the rear of the plywood bulkhead. Make sure that the battery mount is constructed of strong balsa as it must support the battery box.

On the rear of the plywood bulkhead, build up a rectangular section of  $\frac{1}{4}$ " squares, so that the rectangle fits inside the front of the fuselage frame. The rectangle is roughly  $\frac{1}{4}$ " smaller in height and width than the bulkhead and the front of the fuselage, both of which are the same height and width. When this has been completed, the motor mount unit should fit snugly into the front of the fuselage. But if it doesn't, build up or shave away some of the mount so that it fits very snugly.

The landing gear is bent from  $\frac{1}{8}$ " or  $\frac{3}{32}$ " steel wire to the shape shown

on the plans. Solder small brass fittings in the places shown, and drill them so that the landing gear may be bolted to the plywood bulkhead. Coat all joints in the motor mount unit with cement as a precaution against gas leaking in and doing its weakening work. A  $\frac{1}{4}$ " by  $\frac{1}{8}$ " pine strip should be cemented to the front of the bulkhead to provide anchorage for the rubber bands that hold the motor unit and landing gear in place.

### THE WING

**A** TEMPLATE should be made first, by tracing the airfoil shown on the plans onto a piece of cardboard or .025 aluminum sheet. After cutting out the correct amount of ribs, the spar should be carved to shape. Bevel the ends of the center piece and taper the outer pieces from  $\frac{1}{8}$ " by  $\frac{3}{4}$ " to  $\frac{1}{8}$ " square. Shape the trailing edge to the required triangular cross section and assemble the wing on a flat surface.

Cement the ribs in place and slide in the  $\frac{1}{8}$ " square braces that extend through the center section of the

wing. These braces are put in to keep the ribs aligned, because when the covering is applied the shrinking force would naturally tend to warp the ribs.

Before removing the center section of the wing from your work-bench, cement the tip spars to each end of the center one. Although you may believe that  $\frac{1}{32}$ " plywood is weak, use it anyway—or make believe you skipped over this part of the instructions. Do not, however, use thicker plywood than  $\frac{1}{20}$ " for the spar joiners because there is no need for it.

The ribs are tapered by cutting away the lower rear part as shown on the plans. Each wing tip should be built separately. The reason for this is the necessity of supporting the center section of the wing at an angle to the workbench while working on the wing tip portion, which is flat on the bench. After both tips have been finished, add the  $\frac{1}{32}$ " sheet leading edge covering. This produces a better airfoil and also makes the wing more rigid.

(Continued on page 49)



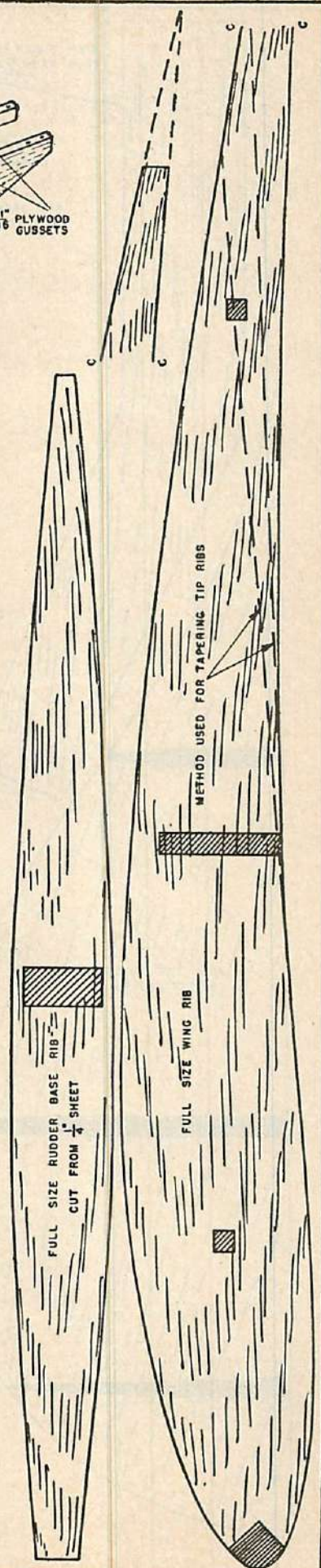
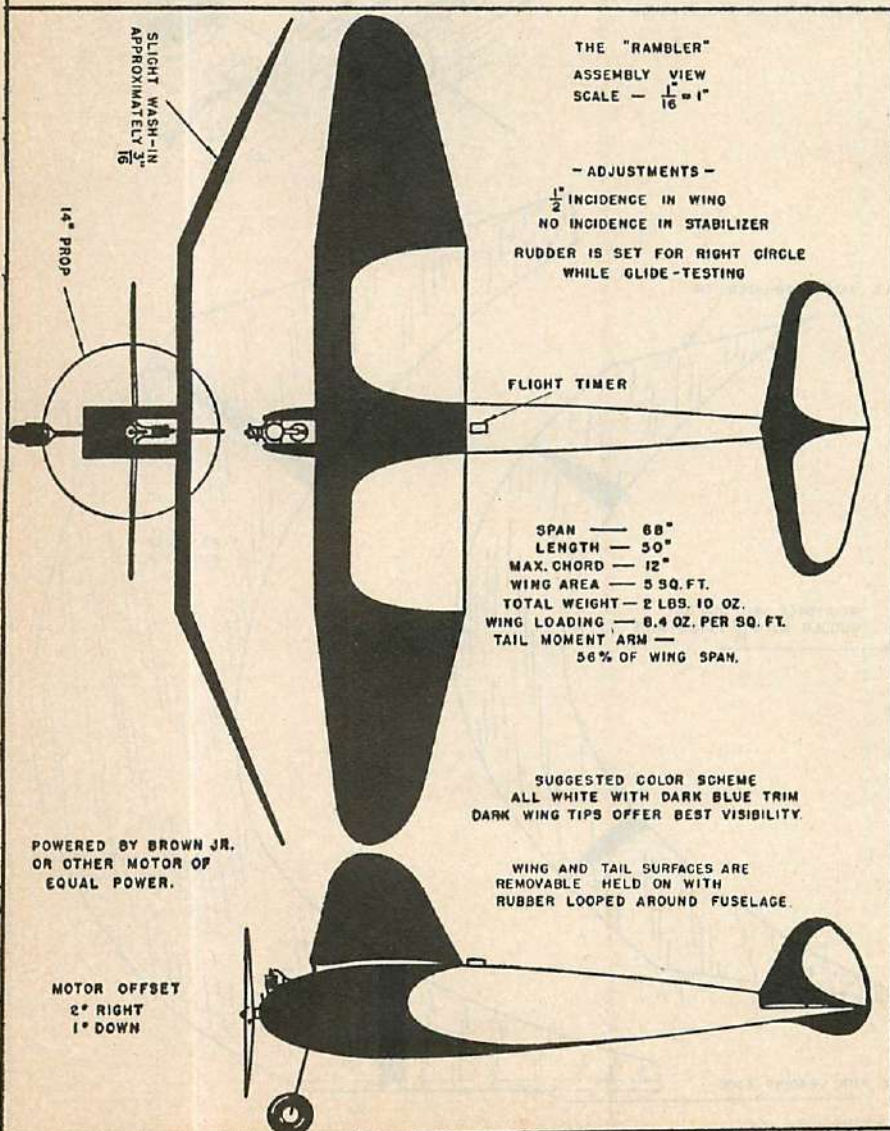
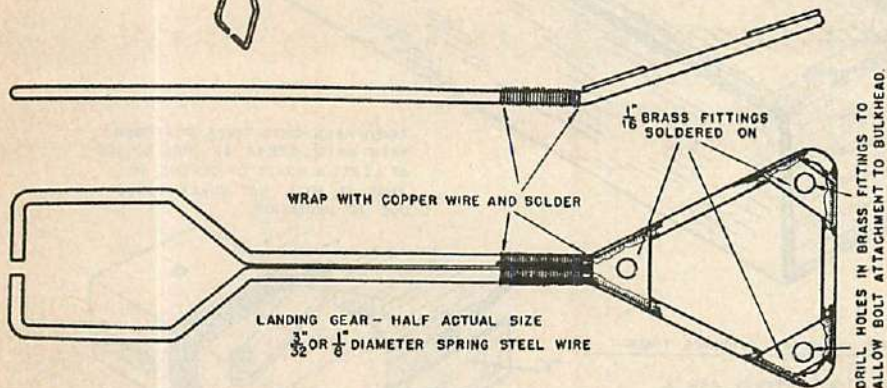
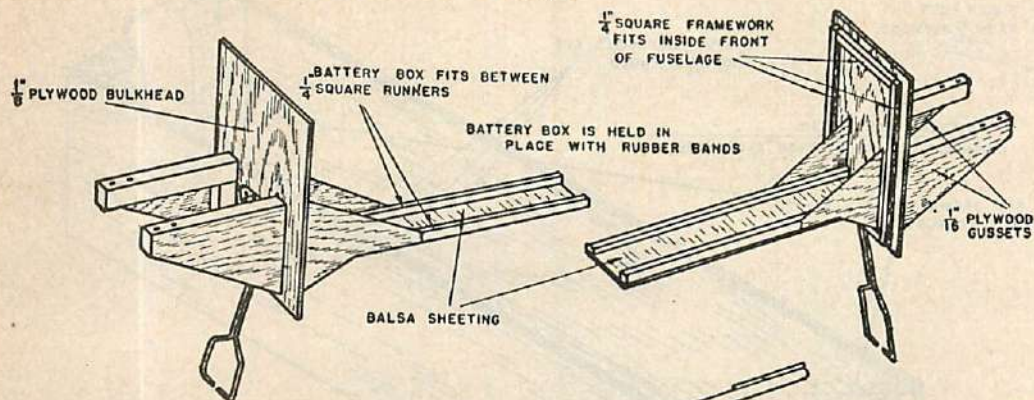
In that top picture on the opposite page we can't see very much of Gil Shurman, the lad who turned out this corking cloud-comber. But here's a swell photo of Gil that was taken right after the "Rambler" copped first place in the Quaker City Gas Model Airplane Association Meet at Philadelphia. Heck, you can't blame Gil for grinning.



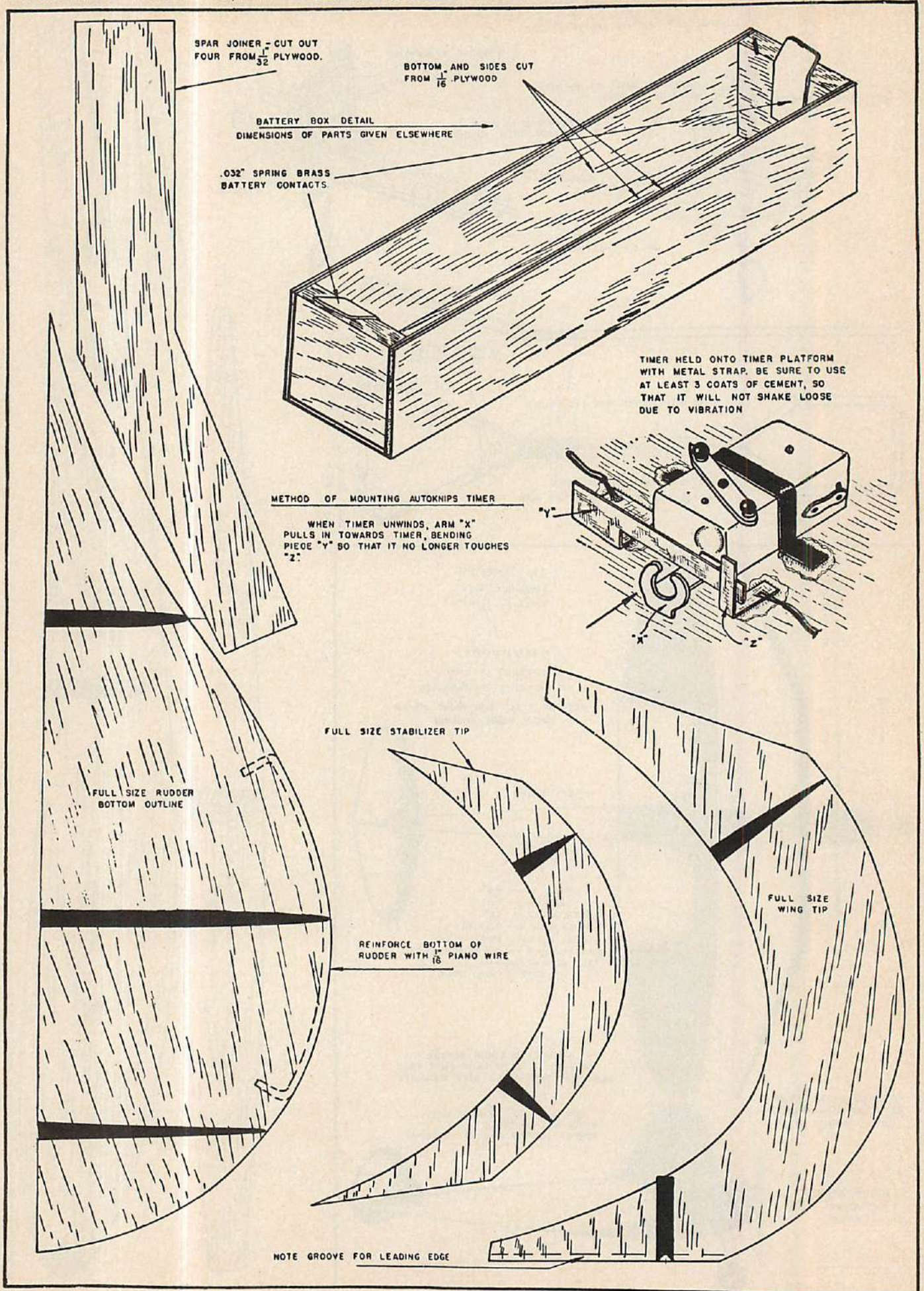




MOTOR AND IGNITION MOUNT DETAILS









# Modelers' News

• • •

**FURTHER WAKEFIELD PLANS**  
**BERNARR MACFADDEN**, publisher and aviation enthusiast, will sponsor the 1939 International Lord Wakefield Model Aircraft Competition to be held at Hicksville, Long Island, on August 6th, according to Charles F. Horner, President of the NAA.

This year's Wakefield contest is expected to see teams of six contestants each from England, France, Canada, Italy, and Denmark, as well as proxy flyers from a dozen other countries.

Macfadden's plans include a cash

award of \$250 to the winning team as well as a plaque or medal presentation to each contestant who comes to the meet. Foreign guests and men prominent in the model field will be entertained by Macfadden at a dinner in New York. The publisher, who is governor-at-large of the NAA, will act as host to the visiting contestants. The competition will be directed by Irwin S. Polk, manager of the National Championship Modelplane Meet. Also associated in the running off of the 1939 Wakefield finals will be the Greater New York Chapter of the NAA and the New York World's Fair.

## "Rambler" Gasoliner

(Continued from page 45)

### TAIL UNIT

**B**UILD the stabilizer directly over the plans and pin the leading and trailing edges down firmly. Measure out the 1/16" by 1/4" cap strip ribs and glue them in, being careful to avoid cementing them onto the plans. The spar is cemented on next, and then the upper portions of the ribs, which should be curved over the spar, producing a thin lifting airfoil. Cement the tips on.

The rudder base rib is cut from 1/4" sheet, as shown on the full size drawing, and the spar should be cemented into it at the correct angle. The trailing edge should be applied next, having been tapered to a triangular cross section first. Add the square leading edge and then cut the cap strip ribs to size and cement them in. At this point, the tail surfaces should be covered with bamboo paper, sprayed with water, and then doped.

The rest of the model should also be covered, and while the water is evaporating carve the tail fillet block out of soft balsa. The tail surfaces should be cemented together well and then color doped, if desired. After you have doped the fuselage and wing, set them aside to dry, and then construct the battery box.

The ignition on a gas model is very important so let's talk about it in detail. The workbench should be cleaned off (including the can containing the gas-oil mixture) and the soldering iron heated. In connecting the wires, try to keep them short. And where a solder joint occurs, make sure that it is small and neat. There should be no bulging solder on the joints because they can be eliminated by holding the well-heated sol-

dering iron below and against the joint and allowing the solder to flow back onto the iron.

In choosing a flight duration timer for your circuit, try to obtain one with built-in contact points. The flight timer is connected to the regular circuit with plain fahnstock-type clips, making an easy removal of the motor unit from the fuselage possible. But before installing your motor in the motor mount, be sure that you are familiar with its peculiarities—every motor "acts up" under certain conditions—and if you aren't, mount it on a pair of motor-runners on your bench. Run your motor until you are positive that you know *everything* about it.

### ADJUSTING FOR FLIGHT

**F**OLLOWING are the adjustments made on the original *Rambler*, which should be applicable to any well-built gas job of similar design.

The model should be glided from low heights. But as soon as you are sure of its steadiness, launch it from shoulder height. The ship should glide steadily, without "galloping," down to a point on the ground about 30 or more feet away from the point where released. The rudder should be adjusted for a right circle in the glide, and then you are ready for a "power hop."

Leave the spark advance-lever at normal on the first flight, and the model should climb very steeply, although "all the juice" has not been poured into the motor. The craft should describe a slight right circle under normal power. But when you "give her the gun" in later flights, it should climb straight up without circling. Yes, you heard me right, straight up! That's the performance you should get because that's what I got with the original *Rambler*.

Well, that's all, and I hope the trophies and cups come your way from now on!



Here's the insignia that H.A. Thomas cooked-up to cop the Nationals' Poster Contest! Incidentally, don't miss Phil Zecchitella's swell story of the meet in our next great F.A.

In announcing that the meet will be held at the Aviation Country Club at Hicksville, Mr. Horner stated:

"At a time when nations are putting so much stress on military aviation, it is gratifying that through the model airplane movement young representatives of many nations will meet in friendly competition to fly their miniature aircraft in an effort to capture the famous trophy which was contributed by Viscount Wakefield, of Hythe, England."

Four of the American Wakefield Team of six will be selected at the Nationals at Detroit. The fifth spot will go to a West Coast contestant. And Jim Cahill, who brought the cup back to America last year by his victory in Paris, will automatically be given a place on the team as the sixth contestant.

### KRESGE CONTEST RESULTS

**O**N SATURDAY, June 3, the Kresge Model Aero Club held a gas craft meet at Hadley Field, New Brunswick, New Jersey. It turned out to be an excellent day for competitions, and the thermals were plentiful. The following fellows took advantage of those heat waves and roared in for high honors:

Class C: First, J. Findra, Sr., 10 min., 20 sec.; second, Roy Oliva, 8 min., 10 sec.; third, H. Spapes, 6 min., 54 sec.; and fourth, Magnus Anderson, 6 min., 53 sec. Class B: First, Don Huff, 5 min., 28 sec.; second, Harvey Watts, 4 min., 14 sec.; third, Gordon Murray, 4 min., 4 sec.; fourth, G. Moru, 3 min., 14 sec.; and fifth, Gus Jung, 2 min., 29 sec. Class A: First, Frank Ehling, 1 min., 27 sec.; second, Dick Boegehold, 1 min., 15 sec.; and third, Jerry Stofoll, 1 min., 12 sec.

Frank Ehling, winner in Class A, took high place for the day and was awarded the Kresge Trophy. Gordon Murray, who placed third in class B, was the defending champion.



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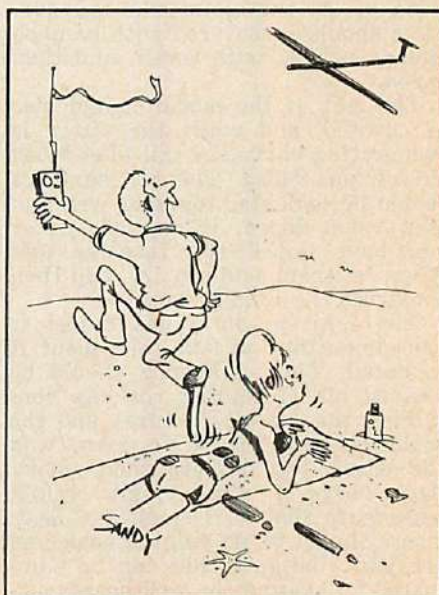
# With Model Builders

by Ed Whalley

I thought I'd be writing this segment from somewhere in Missouri, or Arkansas, or Oklahoma; but here I am back home at the battered old Underwood—batting it out as usual. The plain truth is that we just got started too late in the fall to pull off the extended tour we'd been planning—and we sort of knew it before we started. We'd planned to head south to Clearwater and then come back up the Florida west coast through the panhandle and head straight for Texarkana. The flight plan called for our spending a couple or three weeks in the Ozards and then heading through Kentucky and West Virginia. The whole deal would have given us a chance to attend to some family matters in Florida and some proposed business in the Ozards and Kentucky. The idea was to be back in the Bay State in time the Thanksgiving with grandma and the kids. The trip would have given me a chance to see a lot of the country—again—that I read about in the bulletins you send me. Well, to make a long story short, we made it down to Clearwater and decided to come right home—there's always next year. So this month's material has been carted up and down the whole East Coast. Maybe I'll get to meet some of you folks next spring.

## The FF Scene, So. Cal. Style

• It is probably the result of a variety of social and economic factors, but attendance at the numerous Annuals has been steadily dropping. Most of the clubs in the league (FFMAASC) hold a number of two-day meets every season. Pulling an overniter







This is the scene looking off the hill in back of our FLYING MODELS office building where the F.M. Fabulous Fiftieth Anniversary Old-Timers Fly-In will be held. Dallaire by Duke Hoeckele.

every time some club holds a meet can get to be quite a grind. A number of ideas are being kicked around to insure a better turnout. One is for two clubs to get together on a site and a date; one club runs, say, its All-Rubber meet; the other, its All-Power. Hopefully, each meet gets a bit of entry from the other, and the guys who want to can make both meets on the same weekend. Another idea is to cut some of the Annuals down to one-dayers. They could be combined, as above, cutting a day off the worktime of the ground crews and giving each a shot at more flying. Traditionally, at these meets, the events carded have been scheduled for different days. It has been suggested that *all* events be flown on *both* days. Thus, a guy could pick up his points in a single day's flying. Hopefully, adopting some of these ideas would result in a less-crowded schedule and a greater incentive for attending more of the meets.

• It comes as no surprise to learn that Sal Taibi is the top contender for individual honors in Association point standings. Sal scored 41 points at the Bakersfield Annual a while back to up his total to 77 points. Jim Quinn is leading the rest of the field with 30 points. It looks like Sal is a shoo-in. That 41 at Bakersfield, by the way, is far and away the biggest score ever run-up at one meet. The previous high was 28 points scored by

Jerry Dyer back in '74.

• Taibi added still more to his total at Fresno in late September as he picked up a first in  $\frac{1}{2}$ A with 19:09. If you think that was good time, consider that Paul Stober did 45:00 to win in D, Joe Foster did 42:54 to take C, and Glen Schnider did 35:00 in B. The times ought to look good; there were plenty of good flyers on hand: Manny Andrade, Hulan Mathies, Will Nakashima, Roger Simpson, Mel Schmidt, Jim Quinn and Jack Moreland—among others. Winners included: Simpson (Power); Andrade (Mulvihill); John Oldenkamp (P-30); Rich Rohrke (Cd'H); Bill Humbert (Wake); Bob Boyer (HLG); and, Jon James (Nordic). Steve Geraghty had a good day: a win in Rocket; seconds in Mulvihill and Hand-launch; a fourth in Towline. Young Joey Foster picked up Junior Hi Time with 8:54 in Coupe and 18:40 in B Gas, both good for fifth places in each event (no special events for Juniors only). Stober, who also had a 14:23-fourth in C Gas, took Sweeps. Jim Quinn had two thirds in Mulvihill and Coupe and a fourth in Wakefield. Jim Crockett CD'd, the ladies ran a fine table, the weather was just great, the prizes were super—what more need be said?

• The SCAMPS Ol' Timer meet at Elsinore in October was blessed with beautiful weather. Bill Crovelle got off one of the most spectacular flights of the meet when he put his Hi-Climber into what had to be the grand-daddy of all thermals. The ship attracted the attention of a number of full-scale glider pilots and, soon, no less than five piggy-backers were circling with it. Jim

Dean pulled the prize goof of the day when he launched his 70% Bombshell cum Ohlsson .23 without releasing the timer. The ship disappeared straight up, the motor continuing to be heard for 2:13. His D/T was hooked to the timer, too. Periodically, ol' Jim peered into the sky and swept the horizon looking for the 'Shell. Finally, someone let out a yell and pointed upward. There she was at 200 feet. It touched down about 150 yards from the launch point.

Gene Wallock took the Ohlsson .23 event with a So-Long in 9:28. He won handily over a field of big guns. Jim Quinn took Commercial Rubber with an unspecified design, and Al Heinrich took the Haggart-Bowden Precision (HBP) event with a Spook 48.

### 173 Entries at SL's Big 18th

Out in Salt Lake City, the Utah State Aeromodelers big 18th Annual was a resounding success with a total of 173 entries, 64 in Controline and 109 in Free-Flight. The weather was good, but the wind was brisk on both days. Drift toward the lake prompted a decision to go the Cat. II route in FF. And the wind was a bit of a problem in the Stunt finals. But, all in all, it was a terrific meet, and the big winners were: Perpetual Hi-Point (Marathon) and FF Sweepstakes, Jay Jackson; and, Controline Sweepstakes, Gordon Delaney.

Jay Jackson's performance was outstanding. He amassed a total of 34 out of a possible 40 points to take the FF trophy, and he racked up 29 points toward the Perpetual Hi-Point award. In the race for the Hi-Point, Mark Fechner was second with 23 points;



# Carstens Plans

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 CF-53 AVI 205. Argentinian sportplane. 44" wing. R/C or rubber scale. FM 9-66. \$3.00  
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 CF-64 GYPSY MOTH. DEHAVILLAND 68" wing. 60-71. biplane. 3 types. By Elmer Nowak. R/C/FM 4-62. \$4.00  
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CF-158 BONDROCK BIRD. R/C trainer with 52" span for 15-19 and 15-19 engine. McGovery. FM 4-67. \$3.50  
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 CF-4 FAIRFIELD. Low wing R/C design. 67" span. 45. 19-29 engine. FM 2-62. \$3.50  
 CF-5 CITATION. Multi. R/C. By John Roth. 63" span. 45. High wing. fast assembly. FM 8-62. \$3.50  
 CF-7 RIDGE HAWK. Proportional R/C trainer. Fun ship. 72" span. 49-35 power. John Tudor. FM 8-63. \$3.50  
 CF-11 RIDGEPOPER. 15-19 high wing. 58" span. 11 mil. gear. R/C single. FM 10-62. \$5.00  
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 CF-42 LUCKY 2. Class 2 R/C 60". 45. By Gene Rogers. FM 7-66. \$3.00  
 CF-48 PATRIOT II. Low 62" wing. class II. 61 mil. Bosch motor. proportional gear. Joe Foster. FM 8-66. \$3.00  
 CF-50 B.I.R.D.S. SPECIAL. Class III R/C. 60 mil. ultra standard foam. By Dallas Moran. FM 10-65. \$3.00  
 CF-54 KOBRA II. Class II R/C. 60" span. 45" wing. 29-35 competition model. Gene Rogers. FM 10-66. \$3.00  
 CF-72 DEFENDER. Class II parasol wing. 65" Removable. 1st in 1972. 45. Gene Rogers. FM 4-67. \$3.00  
 CF-77 PIRATE. 51" twin tail mid-wing. 60" wing. 45. By Nick Ziroli. FM 5-67. \$3.00  
 CF-100 SKIPPER. 31" span sport flyer for single channel 1/24 and small R/C. By Vince Michia. FM 12-67. \$2.00  
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 CF-92 1931 NORTHRUP PRIMARY Trainer. 72" span. R/C glider. By Wally Kestler. FM 8-67. \$3.00  
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 CF-102 HYPODERMIC NEURDE. A/2 Nordic with 47" span. By D. Mathis. FM 12-67. \$3.00  
 CF-108 LA MIRA. 66" Nats winner. Hand launched. By M. Mathis. FM 2-68. \$4.00  
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 CF-166 GUMBLEWEED. R/C soarer 111" span. Pod and boom design. By Carl Lorber. FM 11-69. \$3.00  
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**CF-67 SWINGER.** Swept wing CL. stunt 51" span. 35 mil. FM 1-67. By Jack Sheeks. \$2.00  
**CF-72A MITSUBISHI ZERO.** 54" span profile scale CL. for 19-40. combat or sport. Nick Zirol. FM 4-67. \$2.00  
**CF-78 EXCALIBUR.** CL. stunt, 51" span, semi-profile. for McCoy 40 or similar. FM 5-67. Mathis. \$2.00  
**CF-90 STARLIGHT.** CL. stunt, 56" wing for hot 35. By Charles Mackey. FM 8-67. \$2.00  
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**CF-103 FOXEY.** Twin boom sport for 049-051 mil. span. By Bob Adair. FM 12-67. \$1.50  
**CF-111 NOWI III.** 51" span stunt C/L. 1st at 67 NATS. By Dave Gierke. FM 2-68. \$3.00  
**CF-113 GRUMMAN TIGERCAT 77F-1.** CL profile with two 15's. By Bob Adair. FM 3-68. \$2.50

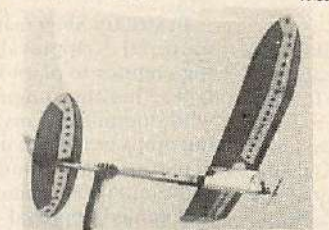
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**CF-134 SPITFIRE STUNTER.** Semi-scale CL 49-1/2" span. 35 engine. By Jack Sheeks. FM 9-68. \$2.00  
**CF-140 COYOTE.** Long lean CL. stunt for 35-40. 54" span. By Dick Mathis. FM 10-68. \$3.00  
**CF-141 FURY.** Stunt C/L. Fox 35 engine. Inake gear. full span fuselage. 54" span. By Don Bambrick. FM 2-67. \$3.00  
**CF-144 WINDER.** CL. combat. 42" span. high speed. for 35. By Terry Prather. FM 11-68. \$1.50  
**CF-147 FORMULA S.** 55" span CL. stunt 2nd at Olsho NATS. By J. Kostecky. FM 12-68. \$3.00  
**CF-149 TORINO.** 53" span CL. stunt, with 35 mil. M. Modern. By Jack Sheeks. FM 1-69. \$2.50  
**CF-153 SCOTSMAN.** 54" span C/L. stunt-swept wing design with full flaps for 35 Jack Sheeks. FM 2-69. \$2.00  
**CF-160 KING COBRA.** C/L. 35 slow combat with 48" span. Vince Micchia. Maneuverable. FM 5-69. \$2.00  
**CF-162 PEGASUS.** C/L. stunt 630 sq. in. 57" span. McCoy. 40 eng. By Bob Howard. FM 11-69. \$3.00  
**CF-164 KNIGHT.** T. tailed CL. stunt, 52" span. 35 mil. By Jack Sheeks. FM 6-69. \$2.50  
**CF-172 H-10.** 51" CL. stunt trainer. Fast building for beginners. Uses 35 mil. By Paul Palanek. FM 6-69. \$2.00  
**CF-173 KAWASACKI.** C/L. Controline. combat profile. for 35. By Vince Micchia. \$2.50  
**CF-181 TEAR-A-LONG.** Combat CL. small and compact. for Cox 15. By Fast Richard. FM 12-69. \$2.00  
**CF-192 NOVI IV.** 55" span controline stunt for 35. By Bob Adair. FM 1-70. \$3.00  
**CF-203 OLD GLORY.** Controline. 53" span. 35 mil. By Jack Sheeks. FM 2-71. \$2.00  
**CF-213 MYSTERY II.** C/L. stunt with 55" span. 29-40 mil. Sensitive. By Jim Van Loo. FM 10-70. \$3.50  
**CF-219 MANDLER.** 29-40 controline all wood sport profile. 36" span. Fast Richard. FM 5-71. \$2.00  
**CF-225 WILSON.** C/L. stunt. Optional foam or built-up. 56" span. Fox 35. By Bob Lamphere. FM 6-71. \$3.50  
**CF-231 MAGISTER.** CL. profile. trainer of French training ship. Fox 35 powered. FM 8-71. By Jack Sheeks. \$2.00  
**CF-246 STUNT MACHINE.** 2nd Place 71 NATS in a sleek 35 pattern CL. Gene Schaffer. FM 12-71. \$3.50  
**CF-257 DOUGLAS SKYRAIDER.** Semi-scale stunt C/L. for 35. By Don Tyndall. FM 3-72. \$3.50  
**CF-258 IRON BUTTERFLY.** FAI. combat C/L with 33" span. By Fast Richard. FM 3-72. \$2.00  
**CF-259 UNITED.** Stunt CL for 35. 53" span. Bob Lamphere. FM 4-72. \$3.50  
**CF-167 BE-WITCHED.** Twin boom stunt controline. 51" span. for McCoy. 40. Jack Sheeks. FM 7-72. \$2.00  
**CF-262 TIGER MIRAGE.** FAI. C/L. team racer for 15 diesel 33" span. Dave Kelly. FM 5-72. \$3.00  
**CF-265 WARHAWK STUNTER.** C/L. stunt for 35-40 mil. with 56" span. By Bill Simons. FM 6-72. \$2.50  
**CF-277 FLY BABY.** Semiscale controline stunt ship. 57" span. 40 McCoy powered. Jack Sheeks. FM 10-72. \$2.50  
**CF-283 PINTO.** 1/2 A. stunt CL. for Cox Tee-Dee. 049 with 34 1/2" span. Dick Mathis. FM 12-72. \$2.50  
**CF-291 MONGOOSE.** Slow combat CL 40" span. 35 mil. By Fast Richard. FM 3-73. \$2.50  
**CF-295 CITABRIA.** Profile stunt for 29 to 40 mil. Dick Mathis. FM 4-73. \$2.50  
**CF-301 PLUM CARRY CASSITT.** Goodyear Team Racer 26" wingspan powered by K&B 15 or other. By Matt Smith. FM 6-73. \$2.00  
**CF-302 VOLUNTEER.** 53" stunt controline. McCoy. 40. Jim Lynch. FM 7-73. \$3.50  
**CF-307 HURRICANE.** Stunt controline with 49" wing. Fox 35 engine. Jack Sheeks. FM 8-73. \$2.50  
**CF-309 EXCALIBUR II.** CL. profile-stunt ship for 40 mil 51 1/2" span. Dick Mathis. FM 9-73. \$3.50  
**CF-312 U-2 STUNTER.** C/L. U-2 spy plane stunt ship for OS Max. 35. 50" span. Joe Adamus. FM 10-73. \$3.50  
**CF-315 SPIDER.** Slow combat controline. 42" wingspan. Uses Fox 36. Lou Woodard and Joe Tallman. FM 11-73. \$2.50  
**CF-316 MISS DARA.** C/L. stunt with 49" span for Fox 36 engine. Dennis Duval. FM 12-73. \$2.50  
**CF-322 GENESIS.** Stunt Controline winner with 52" span for 35 engines. By Bob Hunt. FM 2-74. \$3.50  
**CF-327 P-26 STUNTER.** Stunt Controline by Jack Sheeks for 35 to 60 61" wingspan. FM 3-74. \$2.50  
**CF-329 TALON STUNTER.** C/L. Stunt 1-3R with 52" span. For 15-50. Steve Ashby. FM 4-74. \$2.50  
**CF-332 HEINKEEL HE-219.** Profile twin controline for two 15 engines. 38" span. Joe DeMarco. FM 5-74. \$2.50  
**CF-335 ERCOUPE.** Profile C/L. for 19 to 40 engines. 53" span. Dick Mathis. FM 6-74. \$2.50  
**CF-338 SUNSHINE.** C/L. Stunter for 35 engines. Andy Lee. FM 7-74. \$2.50  
**CF-342 CLIPPER.** C/L. Slow Combat, 5 3/5" span. for 35 engine. W.D. Wiley. FM 8-74. \$2.50  
**CF-344 BISHOP.** Stunt C/L for 35 to 46 engines. 56" span. Jack Sheeks. FM 9-74. \$2.50  
**CF-347 MACCHI 202 C/L Stunter.** ST 46 58" span. Dennis Duval. FM 10-74. \$2.50  
**CF-355 METAPHOR I.** Stunt C/L for 15 engine with 47" span. Bill Bradford. FM 11-74. \$2.50  
**CF-358 P-51B STUNTER.** CL. Mustang. for stunting with 60" span and 60 engine. Jim Vornholt. FM 2-75. \$3.50  
**CF-363 SCORPIO.** C/L. Stunter. 60" span. 46ST engine. Bill Simons. FM 3-75. \$3.50  
**CF-365 PANIC.** Stunt controline for Super Tigre. 46 mil engine with 51" span. By Jack Sheeks. FM 4-75. \$2.50  
**CF-368 "SKYFIRE."** FAI. C/L. stunt profile for Cox foam wing. 28" span. Larry Renger. FM 5-75. \$2.00  
**CF-371 ASTARTE.** Precision CL. Stunter with 63" span. 46 engine. John Hagen. FM 6-75. \$3.50  
**CF-376 MATADOR.** Fast Combat C/L. for 35 and 36 engines. 42" span. Rich "von" Lopez. FM 7-75. \$2.50  
**CF-388 SUNDANCE.** C/L. Stunter with 55" span for 40 engines. Chris Lella. FM 11-75. \$3.50  
**CF-392 MISS JILL.** Profile C/L. Stunter with 52" span. for Fox 35 engine. Jack Sheeks. FM 12-75. \$2.50  
**CF-398 BEARCAT 40.** ZERO Two Profile C/L with 29" span for 09-15 power. Joe DeMarco. FM 3-76. \$2.50  
**CF-404 SQUIRREL.** C/L. Stunter. 53" span. 35-40 engine. Jack Sheeks. FM 4-76. \$2.50  
**CF-409 "METAPHOR II."** C/L. Stunter with 52" span and 35 engine. Bill Bradford. FM 6-76. \$2.50  
**CF-411 TRAGER.** C/L. Navy Profile Carrier. 32" span. 15 engine. Russ Brown. FM 7-76. \$2.50  
**CF-421 THE TORCH 54."** span C/L. stunter for 35 engine. Dick Sarpolus. FM 10-76. \$3.50  
**CF-423 DAZZLER.** 40 C/L. Stunter with 56" span for OS Max 40S. Dave Rees. FM 11-76. \$3.50  
**CF-444 THE WILD GOOSE.** Canard controline stunter with a 48" wingspan for 35 engines. Dick Sarpolus. FM 7-77. \$3.50

**CF-447 GENESIS 46 MK III.** Controline stunter. 60" span for 46 engines. Winner of 1976 Nats. R.W. Hunt. FM 8-77. \$3.50

## FREE FLIGHT GAS

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**CF-19 TIME MACHINE.** Free flight 1/2A. 049 to 051 with 49" span. By Don Chancey. FM 12-70. \$2.50  
**CF-25 WARRIOR 74."** span sport design for 15 engines. \$2.50  
**CF-26 GNAT.** Free flight \$1.00  
**CF-31 SKYSTREAK.** Free flight for 29-35 but adapts to 23 to 40. FM 1-71. \$3.50  
**CF-39 CENTURION.** FAI 65 Nats. winner FF 15. Record 34 45" duration. By R. Simpson. FM 6-66. \$2.00  
**CF-45 ROCK-IT-A-GO-GO.** Jetex powered contest ship by P. Crowley. FM 7-66. \$1.50  
**CF-47 CAVALAN.** 24" span 1/2A free flight. easy build. By Joe Bilger. FM 8-66. \$2.50  
**CF-56 DROP OUT.** X-15 style Jetex powered. By Don McGovern. FM 10-66. \$1.50  
**CF-60 HEAT SEEKER.** Mk III rocket FF 28" span. Jetex power. By Ron Whiting. FM 11-66. \$3.50  
**CF-61 TRIGGER.** 1/2A. contest FF. High thrust line for Cox. 049-051. By Dick Mathis. FM 12-66. \$2.00  
**CF-80 PANDEMONIUM.** 1/2A FF with 48" span. Neat design by Fast Richard. FF contest 1/2A engine. 36" span. unusual. unaltered. By Bill Cowee. FM 6-67. \$2.00  
**CF-107 TEXAS EAGLE.** 72" span FF contest. Hi-thrust for K&B 40. By Dick Mathis. FM 1-68. \$3.00  
**CF-115 SOLITAIRE.** 1/2A. contest FF. for FAI with 44" span. By George Murphy. FM 3-68. \$1.50  
**CF-125 SPOILER.** 1/4A FF. contest design with 32" span. 020 engine. By Bob Adair. FM \$1.50  
**CF-128 HYBRID.** 60" span FF contest class A with 15 or class B with 23. Bob Adair. FM 7-68. \$3.00  
**CF-131 FIRE FLY.** Sport flyer for Jetex 50. Helicat jet engine. Rocket design. Reed Simpson. FM 8-68. \$1.50  
**CF-133 JALAPENO.** FF contest 48" span hi-thrust for FAI. 049. By Dick Mathis. FM 8-68. \$2.00  
**CF-135 EAGER EAGLE.** Class C FF with 90" span. 40 power. William Harding. FM 9-68. \$3.00  
**CF-145 HYSTERIA 60.** 53" free flight with 15 engine. By Dick Mathis. FM 1-69. \$3.00  
**CF-152 C-NECK MYTH.** FAI FF design with 62" span. 15 engine. By Reed Hull. FM 4-69. \$2.00  
**CF-178 ONE GRAND.** FF class C. 80-1/2" span. 1000 sq. in. 40 year rotor engine. Dick Mathis. FM 2-67. \$3.50  
**CF-191 LASER CHASER.** FF 1/2A 48" span. with Warren truss mast spring wing on pylon. K&B 40. FM 4-70. \$2.00  
**CF-196 HYPERHOUSE.** 1/2A. FF. payload. 34" span. for former. PAA event. Uses 020. Dave Linstrom. FM 8-70. \$2.00  
**CF-218 TORNAADO.** 48" span 1/2A free flight competition. Tee-Dee. 049. Reid Simpson. FM 5-71. \$2.00  
**CF-221 LIMBY 1/2A POWER.** High climbing FF contest design to British formula. 049. Dave Linstrom. FM 6-71. \$2.00  
**C-222 GO-CARROT.** 48" span free flight for Cox Tee-Dee. 020. FM 15. By Dave Linstrom. \$2.00  
**CF-224 BURRITO.** FF. FAI. A/B with 65" span. 23 mil. By Tom Hutchin. on FM 6-71. \$3.50



**CF-242 LIPSTICK C.** Al Vela's class C freeflight for 40 mil with 80" span. Union jack construction. Formidable climb trajectory. FM 10-71. \$5.00  
**CF-253 RAMBUNCTIOUS 1040.** Class C free flight. 1040 sq. in. for 40. Fast Richard. FM 2-71. \$5.00  
**CF-254 RAMBUNCTIOUS 480.** Class A/B free flight for 40. By Bill Simons. FM 2-71. \$3.50  
**CF-268 EXCELSIOR FAI.** 1972 FAI Power Nats 1st Place winner free flight. 64" span. K&B or Rossi. 15 Seelig Team D/T. auto timer. Dave Rounsaville. FM 7-72. \$2.50  
**CF-271 ZINGO.** FAI power free flight for 15 mil engine. Tom Hutchinson. FM 8-72. \$2.00  
**CF-278 DANDYLION.** Nitty powered free flight for 049 mil with 36" span. Fast Richard design. \$2.00  
**CF-279 PEARL.** 450. Class A and FAI power free flight for 15 (K&B). Bill Chenault. FM 11-72. \$3.50  
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**CF-288 EXCELSIOR C SPECIAL.** K&B 40 free flight. B-C power for 29-40. 25ths. Dave Rounsaville. FM 2-73. \$4.00  
**CF-294 20/20.** 20" span. hand launch glider. 20" length. Larry Kruse. FM 4-73. \$1.50  
**CF-323 MEDICINE MAN.** FAI Free Flight Power for 049 engine with 44" span. Jim Clem. FM 7-74. \$2.00

**CF-351 THROBACK.** F/F Sport. 29" span. 020 engine. Larry Kruse. FM 11-74. \$2.00  
**CF-318 MAXI-PEARL.** F/F Power for Classes B-C-D for 29 to 40 engines. 86" span. By Bill Chenault. \$4.00  
**CF-325 STAR SEEKER.** Class A/B contest free flight for 19 engines. 52" wingspan. Mike Hallum. FM 3-74. \$2.50  
**CF-330 JUBILEE.** Competition F/F with Old-Timer looks 74" span. 29-23 engines. Dick Mathis. FM 4-74. \$2.50  
**CF-346 STANDARD SCALE.** biplane for rubber F/F or 020 and lightweight R/C 36" span. Hurst G. Bowers. FM 10-74. \$2.00  
**CF-362 BAD MEDICINE.** FAI F/F 43" span. 045-051 engine. Mike Ransom. FM 3-75. \$2.00  
**CF-381 PARFAI.** F/F FAI Power. 15 engine. 61" span. Chuck Markis. FM 9-75. \$3.50  
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**CF-387 ETRICH TAUBE.** Free Flight Scale antique with 32" span. W.R. Stromman. FM 10-75. \$2.50  
**CF-402 QHAVILLAND DH-10.** F/F Scale. 49 1/2" span. Two Astro Flight 020 electric motors. W.R. Stromman. FM 4-76. \$2.50  
**CF-416 1910 FABRE HYDRATION.** F/F scale seaplane for Cox 020 engine. 35" span. W.R. Stromman. FM 9-76. \$2.00  
**CF-419 HELLA-PENO.** FAI-A competition F/F with 47" span. for 049-051 engines. Dick Mathis. FM 10-76. \$2.50  
**CF-421 QHAVILLAND DH-18.** span 020 scale Free Flight. W.R. Stromman. FM 1-77. \$2.00  
**CF-445 HALF-SIZED SCRAM.** Old time replica. 1938 Flying Aces from original 1938 design by Ray Heit. Free flight for 020 engines with a 40-inch wingspan. D.B. Mathews. FM 7-77. \$2.00  
**CF-449 ALKALYRIE MODEL A NO. 1.** Free flight electric scale for the Astro Fide 02 motor. 37" span. W.R. Stromman. FM 9-77. \$2.50  
**CF-452 COUNTRY BOY 650.** Competition Free Flight for Classes B and C. Engines from 20 to 41. Jim Clem. FM 10-77. \$2.00  
**CF-457 FANTASY COY.** sport free flight with a 21 1/2" wingspan. Larry Kruse 12-77. \$2.00

## RUBBER

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**CF-55 SAM-PAN.** Unlimited rubber design. 54" span. tubular fuselage. By Danwoody. FM 10-66. \$3.00  
**CF-68 SKYSRAPER JR.** Unlimited rubber. 36" span. FM 1-67. Bill Hatcher. \$2.00  
**CF-73 COMPA-NARD.** 300 sq. inch unlimited rubber pusher. Canard. By K. Johnson. FM 4-67. \$2.00  
**CF-79 MICHELLE.** 53" Wakefield. 40 grams rubber. By Roger Simpson. FM 5-67. \$2.00  
**CF-91 SOUTHERN.** Unlimited rubber folding prop. high aspect ratio with 52" span. By Bob Adair. FM 8-67. \$2.00  
**CF-96 MINNIE.** Coupe D'Hiver 33" wing. FF rubber. By Joe Bilger. FM 9-67. \$2.00  
**CF-124 PSYCHEDELIC TWINS.** Rubber. Two plans for indoor flying. Unlimited. Paul Kessler. FM \$2.00  
**CF-155 SLANDER.** 55" span unlimited rubber for FF contest. By Bob Adair. FM 3-69. \$2.00  
**CF-182 TUBBY T.** Great FF rubber by Dave Linstrom. FM 7-70. \$1.50  
**CF-193 LITTLE LUM.** Coupe D'Hiver unlimited rubber. uses old Wake motor. Dave Linstrom. FM 5-70. \$2.00  
**CF-202 BUCKER JUNGMASTER.** 22" wingspan rubber scale biplane. John Blankenship. FM 2-71. \$3.00  
**CF-217 SPERRY MESSENGER.** 20" span rubber semiscale biplane. John Blankenship. FM 5-71. \$2.00  
**CF-260 CHANCE VOUGHT KINGFISHER.** 18" span rubber scale. FM 8-72. \$2.00  
**CF-264 LUCKY PIERRE.** 32" span rubber powered Coupe D'Hiver. By Don Tyndall. FM 9-72. \$2.00  
**CF-296 FOCKE-WULF 109 U-9.** 17 1/4" span rubber flying scale. By Preston Brunning. FM 5-73. \$1.50  
**CF-300 TWIN FIN.** Unlimited rubber design for 16 strands 6mm rubber. 47 1/2" span. By Bob White. FM 6-73. \$2.00  
**CF-304 WHIPPET.** 36" sport rubber design by veteran Ted Strader. FM 7-73. \$2.00  
**CF-320 BEAU COUPE.** 48 1/2" span Coupe D'Hiver rubber. Bob White. FM 1-74. \$2.00  
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**CF-399 SCORCHER.** Competition Jetex bu with 30" span. Stan Chichek. FM 3-76. \$2.00  
**CF-430 LOCKHEED WASP-VEGA 5.** "Winnie Mae" 30 1/2" span F/F. Scale for Hylork 48 Electric motor. George Meyer. 2-77. \$2.50  
**CF-432 THE WINTERHAWK 42."** span Coupe D'Hiver. rubber powered. Jim O'Reilly. FM 3-77. \$2.50  
**CF-436 JUNGSTER II.** 20" span Rubber Scale biplane. George W. Meyer. FM 4-77. \$2.00  
**CF-440 THE BANDIDO.** Rubber power d sport free flight 18" span. Larry Kruse. FM 5-77. \$2.00

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Gordon Delaney, third, with 22. Kit Taft was second in the FF events with 21 points, and Ron King was third with 15. The Controline points race saw Marc DiFrancesco come second with 19 and Fechner third with 18. Competition was tough all the way.

In those events in which he took firsts, Jackson won handily. These were: Coupe, .02 Replica, Unlimited Rubber and B Gas. He took a second in C Gas despite maxing-out. R. King went on to an 11:25 total to take this one. Delaney took firsts in Stunt and Sport Scale, a second in Goodyear, thirds in Slow Rat and Balloons, and a fourth in Slow Combat. DiFrancesco had a win in Goodyear and picked-up points in four other events.

Other individual winners, by category, follow. Free-Flight: Mike Taft, HLG; J. Zeisloft, A Gas; Brad Anderson, 1/2A Jr./Sr.; Kit Taft, A/1; Barney Taft, 1/2A Open; Kit Taft, A/2; Brad Anderson, HLG Jr./Sr.; Noal Hess, Scale; Mark Fechner, OT Pylon; and J. Sanford, OT Cabin. Controline: Jim Womack, Slow Rat; Pat Johnston, Carrier; Mark Fechner, Balloons; Brad Anderson, Junior Balloons; Jim Rhoades, Speed; and, Cleve Binney, Slow Combat. Rhoades, incidentally, turned 87.81% of record in taking Speed. Each event had its own individual staff of directors, but Bod Sward and his wife put things together at the records table, an important assignment for which they deserve special recognition.

### An NCLS—Let's Get with It

For quite a while now a lot of folks have been beating the drums for the formation of a National Controline Society. Dan Rutherford has advanced some excellent reasons for a Society in Model Builder, and Dr. Laird Jackson has done the same in the Gazette. Prior to the Nats, there was quite a lot of talk about getting organized; but, to date, nothing definitive has happened. Now, George Mattei of the Combat Association (MACA) is taking the initiative. In a letter to all special-interest groups, he is asking them to appoint a representative or contact person and to send him that rep's name. In effect, George is accepting the responsibility for putting together the nucleus of an NCLS and not just blowing on the fire. All he needs is a little good will and cooperation. As he puts it:

"A speedy selection and response to this letter by each special-interest group is of the utmost importance. With speed, a national group can be formed and working early in 1978. Let us not neglect this opportunity to put an end to all the talk and show the modeling world that Controline flyers can unite into an organization to benefit all."

Offhand, we can't think of a single reason—beyond sheer inertia—why George's proposal couldn't result in a functioning organization from which, ultimately, an all-inclusive, service group could evolve. It's a matter of combining efforts and resources. For example, there are at least three or four individual Controline publications which could be expanded (with a little funding) to provide a viable house organ or sounding board for the proposed Society. These include the MACA Newsletter, Stunt News, Patty's Pinkie, the Gazette—and even a few strictly local efforts. And we just can't visualize any genuine conflicts of interest—inside or outside of the Academy—between Controline groups. We say: Let George DO it—even better, HELP

him do it!

### MACA Sample Shows Preferences

A recent issue of MACA News carried the results of a poll by Ron McNally, chairman of the CLCB, on proposed rules changes. The questionnaire covered matters peculiar to Slow Combat and to Fast Combat as well as to those pertaining to both. The respondents were seventy-six in number, and practically all voted on every question. Since Combat is such a popular event, we thought the results might be of interest to a lot of other flyers.

To begin with, overwhelming numbers of respondents favored things like rewriting the AMA Combat rules for clarity and simplicity, eliminating the builder of the model rule for Combat, using points instead of a rematch in case of a double kill, and allowing .15 ships to use .012 lines with a 25-pound pull test. They were strongly against requiring the pilot to start his own engine or requiring a one-minute starting period a la FAI. (It should be noted that the sentiment against requiring the pilot to start his engine excepted Juniors—who, presumably, would be expected to start their own—and that sentiment was about evenly divided on the general proposition.) There was overwhelming support for eliminating line-tangle rules while still holding to the idea of a mid-air ending the match. And about 2 to 1 favored lengthening the kill zone from 4 to 6 feet.

In strictly Slow matters, there was nearly universal disapproval of such items as limiting engines to plain-bearing, single-bypass types, limiting engines to plain bearings while permitting any type of bypass, limiting props to 10-inch diameter (unmodified), or requiring a minimum span of 34 inches in addition to 300 square inches of area. Items that gained approval included: eliminating kills (first string cuts count 100 points, match goes on), requiring engines to be produced in 1000-unit lots with major components produced by the original manufacturer, eliminating landing gear, requiring a five-inch space between the prop washer and the leading edge, and rewriting Slow Combat rules.

### The FAI FF Program: A Point of View

"At this point in time, it might be worthwhile to pause and take a look at the FAI FF Program. The number of contestants dropped somewhat from last program's high of around 300 to this year's 237. This drop in number is cause for reflection. Is the Program failing? Or is the Program designing itself along lines reflecting the wishes of its participants?"

"For nearly two years as Program Committee Chairman, I listened to dire predictions of what would happen unless the pet theories espoused by various parts of the country were adopted. If these theories weren't adopted, the story would go, the Program would go downhill. As with all kinds of ideas or plans, there never seemed to be any unanimity of opinion; in fact, there was seldom a clear consensus. Has the Program bureaucratized itself into the ground? Why won't someone step forward and volunteer to be the program manager? Why are sites and sponsors so hard to find?"

"As I see it, the issues are complex and intertwined. The size of the Committee is unwieldy. No one has authority to do anything

without polling the others. The Chairman can make decisions, but he is subject to being countermanded. AMA doesn't want the headaches. And who can blame them? We are, in fact, stewing in our own broth."

"Perhaps we have run full circle. Perhaps it is time to review the whole concept of a democratic committee. Perhaps we should return to the previous format of a program administrator with his own small advisory group and let him run the whole thing—if we can find such a person. I offer no solutions as I believe that the entire problem is too complex to be solved within the current organizational structure."

"Personally, I enjoy flying in the Program—and letting Wayne Drake represent me because I don't want to spend the time it took to be a conscientious committee chairman or a working member. Besides, it's more enjoyable just flying; that's the reason I took up this hobby in the first place. And I believe that this attitude is shared by many (far too many) of us in the Program. The difference is that I've been there. Have you?"

—Bob Stalick, WMC Patter  
(Bob needs no introduction to WMB readers. His contributions to organized modeling and competition touch all bases: local, national, international. He's been the target of a certain amount of flak from people who seem to have to blame some individual for alleged inadequacies in the last Program. Characteristically, Bob's writings over the years have addressed the issues without attacking personalities.)

### A Visit to Thunder Bay

This is kind of a low-key story we've been saving for a slack period in flying activity, but it kind of ties-in with the start of the Indoor season which ought to be picking up about the time you read it. It involves Greg Thomas of the Minneapolis gang and Ron Limbrick of Thunder Bay. And it illustrates some of the more enjoyable aspects of modeling.

Greg and Ron met at an Indoor meet in Duluth in January of '76, and they hit it off right away. Duluth is a couple of hundred miles north of the Twin Cities, and Thunder Bay is about another hundred or so miles up the coast of Lake Superior in Ontario. It wasn't long before they were introducing each other to their families and swapping ideas and information. What follows would make sense to no one but a modeler. Only a guy who'd drive from Minneapolis to Duluth to fly Peanuts in January would pop his wife into the car and head for Thunder Bay around the end of April.

Well, that's what Greg did. It took about ten hours of driving for Greg and his wife, Val, to get up to Thunder Bay and put in a call to Ron and Joan. The excuse was a contest Ron was running the next day in a local gym. Needless to say, the Thomases were warmly received at the Limbrick menage, and an enthusiastic bull session, culminating in a midnight buffet, followed. There were shelves of Peanuts, books full of plans and pictures, and all of the support data dear to the heart of the dyed-in-the-wool Scale buff. The boys were right in their element and just couldn't call it quits. And Ron was busy trying to finish-up a bunch of hand-crafted trophies. Typical, right? Well, just remember that Greg had left home at seven in the morning.

They got to the gym on Sunday around 9:30 to do a little testing. The site appeared



to have about forty feet of clearance and boasted a unique feature, a perimeter running track about twenty-five feet above the floor. This proved to be an excellent vantage point for spectators; and at one point, Greg counted thirty or so. Whenever a ship turned in a good flight, the folks in the gallery applauded, and this added another dimension to the accomplishment.

And the emphasis was on flying. At this meet, there was no initial scale judging. All you had to do was wind up the ship, catch a timer's eye, and let 'er go. Posted standings were based on flight times only; only ships involved in ties would be judged. The turn-out reflected the eclectic taste of Scale modelers. The field included Cougars, a P-51 from Peck Polymers, a Draine Turbulent, Mustangs, Ganagobies, Scout, DSA's, etc. Around 2:00 P.M., everyone stopped flying, and the scores were tallied.

Perhaps fittingly, Greg and his Cougar ended up in first place. A second Cougar, flown by Frank Phillips was second in 114. And a father-and-son team, Bud and Dave Saunders, took third with their Peck's P-51. Times were not as high as Greg expected. The building was great, but the wind outside was doing its best to show how Thunder Bay might have gotten its name.

Ron's unique trophies were presented at the prizegiving. Basically, they were engine components, polished-up and mounted on gleaming mahogany. Greg carted home a piston from a P&W Radial which he could only describe as "elegant." It now occupies a place of honor in the Thomas display. Other parts, such as spark plugs, were also used to good effect.

It was a good meet. It left everyone feeling high. The friends hurried through their warm farewells, and the Thomases made a fast detour through downtown Thunder Bay just to see the town before heading back to Minneapolis. The lift lasted all the way home. It still sparks a glow. And you can bet it's reflected up in Thunder Bay whenever the Limbricks recall the meet.

## Short Items of General Interest

- Contestant judging was used to good effect at the North Carolina State Pattern Champs last September. Following a developing trend, the judges were encouraged to talk to the flyers after their flights in an effort to up performance. Reportedly, the commentaries were well received and generally appreciated. Dave Burton and the Monroe group ran a swell meet.

- Coming on the heels of their recent troubles with a neighboring farmer and the consequent moving of their flying site, the Illinois Valley bunch got some good news. Now they have a choice of sites. Howard Halm started the ball rolling, and now Pres. Mark Fitzgerald has a letter from Jon Blume, the superintendent of Starved Rock State Park, confirming his verbal permission to fly on the site. Starved Rock is just south of Matthiessen State Park.

- The Birmingham R/C bunch flies from a small field out off Galveston Street, affectionately known as "the rock." From the air, it's roughly triangular—a barren patch in a sea of woods. It contains a metal shed and a couple of runways. And it's kind of a curiosity to overflying pilots. It looks as though R/C would be the only way to go on the site. But, not so! Arriving at 7:30 one morning for a bit of flying, a couple of guys found five

FF'ers on the rock trimming out their ships. For a change, they sat back and watched the show as the boys put their rubber ships, gliders, towliners, and even a couple of power ships up for short hops. Honest, Free-Flight isn't dead in Birmingham; the local boys have been doing well at places like Pensacola and Tullahoma over the past season.

- Catapult gliders are one of the oldest types of models, but you seldom hear much about them today. The Illinois Model Club, however, run an annual "Turkey Shoot" catapult venue every November. This year, on the same date and on the same site, they're running a concurrent Coupe and P-30 meet. It sounds like a good deal for a small field. Love that P-30 idea!

- That 25th Anniversary for the DCRC was an unqualified success. Fifteen of the 23

past presidents showed up at the meeting held in the Johns Hopkins Applied Physics lab in nearby Maryland. Awards were handed out to all of these plus the four charter members with continuous membership: Walt Good, Don Clark, Reg Mitchell, and Jim Reed. Also on hand for the nostalgic binge were John Worth and Bill Winter. Slides, films and exhibits gave everyone a look at the history of a great club. Pete Bodnaruk won the 5-channel R-S system in the drawing. Pete's a longtime member of the club.

- Reportedly, Paul MacCready and his associates poured over \$25,000 into the Gosamer Condor. That \$86,000 Dremer prize wasn't all gravy, MacCready says that, if he can get the weight down to 55 pounds, an athletic bike-peddaling pilot could keep the ship up for hours. The winning 1.3 mile

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## A HOBBYPOXY HOW-TO:

# PREPARING WOOD FOR PAINT

The key to a good paint job is proper preparation. All surfaces must be smooth and clean.

Let's look at smooth first: Wood has grain, and sometimes nicks and dents, and maybe knots and worm holes. For filling it's best to select a material that's just slightly softer than the wood itself. That way, you can sand the filler smooth without digging ditches in the surrounding surface. First seal the wood with a coat of Hobby-poxy Clear. Let it dry. Fill any dents with Hobbypoxy Stuff straight out of the can, let it dry, then sand it smooth. For grain filling I recommend Stuff, Hobby-poxy Filler, or Hobbypoxy Undercoater White. Stuff, thinned to brushing consistency with Hobby-poxy Thinner, goes on easy, sands easy, and fills fast. But it's pretty soft. Filler is a little harder to sand, but results in a harder surface. Undercoater White is a true two-part epoxy and gives the best results, but takes more time. Stuff and Filler are perfect for balsa models, while Undercoater White works great on plywood.

The secret to grain filling is not how much filler you put on, but how much you sand off. Generally speaking, you should sand the first couple of coats right down to the bare wood. This leaves the filler only in the low spots — which is precisely what you want. Follow this with one more coat, sanded smooth, and you should be ready for the top coat.

Now to the clean part: Before you paint you should remove all dust, oily fingerprints and other bad things from the surface. A careful vacuuming, followed by a gentle wipe-down with cheese-cloth dampened with thinner will do the job nicely. Don't use paper towels—they leave lint. Once it's clean, avoid handling the model too much. Now paint, using Hobbypoxy (preferably) or any other product. All Hobbypoxy filler materials, once completely dry or cured, are compatible with dope, epoxy, enamel and other model paints.

For more info, send for a free copy of "Poxypainting Pointers".

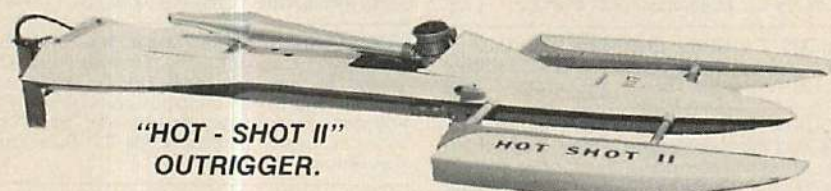
**John E. Pox**

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flight took 7 minutes and 22 seconds for an average speed of 11 mph. Fifty-five pounds?

• Winners at the S.C. State Pattern Champs at Spartanburg included: Denny Martin, Novice; Tom Vaughn, Advanced; Phil Kimbrell, Expert; and, Larry Nash, Master. Johnny Powers took Stand-Off Scale, and Tom Kiril got the Best Sportsman Award.

• At the Ol' Timers meet in Vegas, Don Weitz took both the Hi-Time Trophy and the Chambers Pot. He did 14:08 in C Pylon, 7:24 in B Cabin, and 8:23 in Antique—winning all three events. He used his famous Clipper and one of the best flying Playboys currently making the rounds. On Saturday the weather was gusty and rainy and a lot of ships were going over the hill. Taibi's Powerhouse was one of these. Sunday, the weather changed for the better as the rains stayed in town and the cloud cover kept the temp's down. Jim Adams took AB Pylon in 8:54, beating Taibi and Oslan; Oslan took .02; Fred Caballero took C Cabin; and, Bud McNorgan took the Five-Buck event.

• Up in the Pine Tree State, the Lewiston bunch ran a fall meet for Slow Rat and Combat. Prizes were cash from the entry fees (jackpot). Lloyd Seymour, Rod Adair and Joe Griffin took the money in Rat; Dave Harrington, Adair, and Seymour were the winners in Combat.

• Judging and judges always come in for a lot of abuse in everything from horse shows to Stunt and Scale events. Wynn Paul went over his data on Stunt events reported in Stunt News since 1975 and compiled some interesting stats. A total of 162 different judges officiated at the meets reported. Of this number, only 17 worked four or more meets. Only 35 judged at three contests during the three-year period. From the figures, it seems that many just work one contest per year, plus a possible "other" meet; and there are many guys who work only once every two years.

Of the 64 flyers carried as Master/Expert, only 11 have actually judged at two contests in three years. And only 8 have averaged one contest per year. Of the 179 flyers carried as Advanced flyers, only 36 have judged one contest in the last three years. The conclusions Wynn reaches are obvious:

Stunt flyers can't criticize judging if they don't do any themselves. And how can flyers expect competent judging from judges who get as little exposure to the practice as only one meet per year? Talk is cheap, Paul concludes, and he suggests that it's high time a Judges Association was formed.

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## The 1977 IMPBA Internats

PHOTOGRAPHY: TOM PRYZENTKA, OCTURA MODELS



This year the action was in New Orleans but the Texas folks came out on top of the heap/**Sherry Matthews**

Come on down to New Orleans, and come they did! Over 200 entries showed up for the 1977 IMPBA Internats hosted by the Southern Gentlemen Racing Association. This was the first time the Internats were held in the South and it proved quite successful.

Upon arriving, the boaters found Miller's







Gene Klisnick (left) is shown launching Mike Meelbush's F-hydro winning king-size Wing-Ding. Bud Baird (right) is launching his son's boat. The trophies (opposite page) were very beautiful, unique and custom made.



Mike Wilson, left at left, is shown receiving the Excellence of Performance Trophy from Leonard Skwiera, IMPBA President at right. Fred McBroom right at right, is shown making the coveted Lesser Boaters awards.



Rip Holdridge, left at left, is receiving the Aloha Cup from Jim Alexander for the Dallas R/C boat club for most members in attendance. The three F-hydro winners Mike Meelbush, Dick Schulte and Bob Finn are shown here with the prizes donated by Bob Murphy of Shamrock Competition imports.

Lake to be ideal for this event as there are two separate courses. Trees lined the oval course and the sun lined the straightaway. Anyone who ran straightaway definitely went home with a nice Louisiana sun tan. The weather was so helpful, it only rained when everyone was under the trees and only because the lake needed refilling.

Scale and trophy trials were run with a minimum of problems. Record trials had a few exciting moments when a couple of boaters came close to setting new records.

The Southern Gentlemen introduced a first by having 3 days of heat racing. This was an improvement in that the schedule was not rush-rush-rush. However, all was not done in typical Southern ease as a little shower chose to quicken the pace.

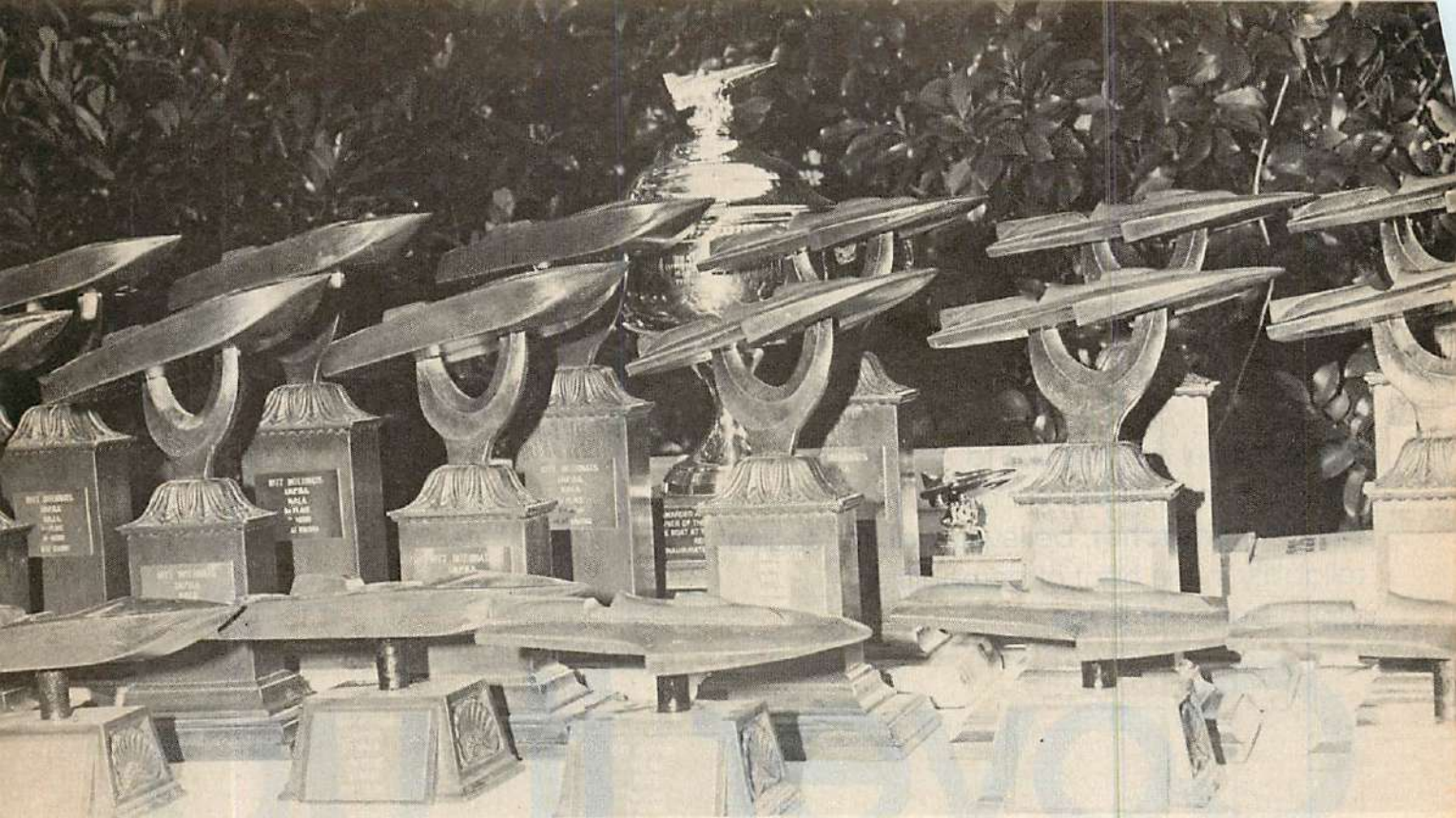
A few highlights, or lowlights to the people involved, were: boaters trying to move the lake's island to a new position; seeing just how hard the dock was; trying to play "got cha" with the nets; and seeing which boat was the strongest. Another highlight

was having a lady boater—the first lady to drive a twin in competition.

Thanks should be given to various groups and individuals for their support of this race: KOA, Ramada Inn, Bob Murphy, Cox, and Phil of Murphy's, to name a few.

Mention should also be made of the aid and assistance from the many boaters without whose help the Internats would not have succeeded. To each and all—a Thank Ya'll. You're the best of friends—say the Southern Gentlemen!





## 1977 IMPBA Internats Results

### 1/16 Straight TROPHY TRIALS

#### B Mono

1. Don Albrecht, TX
2. David Preusse, IL
3. Conrad Cupitt, LA

#### D Mono

1. Mike Wilson, TX
2. Carl Coco, TX
3. Scott McGuffin, FL

#### E/F Mono

1. Mark Hughes, TX
2. Rip Holdridge, TX
3. Herb Stewart, FL

#### B Hydro

1. Marten Davis, IN
2. Howard Whitaker, IN
3. Tom Grannis, IL

#### D Hydro

1. Don Pinckert, FL
2. Howard Whitaker, IN
3. Lew Mettetal, MI

#### E Hydro

1. Gene Adams, CA
2. Marten Davis, IN
3. Boyd Breaux, LA

#### F Hydro

1. Tom Pretzfeld, FL
2. John Bridge, Jr., MI
3. Dick Schulte, FL

### 1/3 OVAL TROPHY TRIALS

#### B Mono

1. Don Albrecht, TX
2. David Preusse, IL
3. Herb Stewart, FL

#### D Mono

1. Mike Wilson, TX
2. Gary McGee, TX
3. Scott McGuffin, FL

#### E/F Mono

1. Mark Hughes, TX
2. Mike Wilson, TX
3. Rip Holdridge, TX

#### B Hydro

1. Howard Whitaker, IN
2. Tom Grannis, IL
3. Marten Davis, IN

#### D Hydro

1. Howard Whitaker, IN
2. Jay Maguire, FL
3. Al Wolfe, LA

#### E Hydro

1. Gene Adams, CA
2. Saunders & McGee, TX
3. Bobby Brownlow, TX

#### F Hydro

1. Louis Durand, Jr., LA
2. John Bridge, Jr., MI
3. Bob Dudinsky, FL

### HEAT RACING

#### B Mono

1. David Preusse, IL
2. Todd Wilson, TX
3. Herb Stewart, FL

#### D Mono

1. Mike Wilson, TX
2. Kenneth Koehn, TX
3. Gary McGee, TX

#### E/F Mono

1. Ricki Stewart, FL
2. Don Ross, TX
3. Rip Holdridge, TX

#### B Hydro

1. Marten Davis, IN
2. Howard Whitaker, IN
3. Phil Marsteller, OH

#### D Hydro

1. Louis Durand, Jr., LA
2. Jay Maguire, FL
3. John Ackerman, IN

#### E Hydro

1. Mike Meelbusch, IL
2. Gary Preusse, IL
3. Carl Coco, TX

#### F Hydro

1. Mike Meelbusch, IL
2. Dick Schulte, FL
3. Bob Finn, TX

### IMPBA US #1 National Championship

#### B Mono

- David Preusse, IL

#### B Hydro

- Marten Davis, IN

#### E/F Mono

- Mark Hughes, TX

#### E Hydro

- Gene Adams, CA

#### D Mono

- Mike Wilson, TX

#### D Hydro

- Howard Whitaker, IN

#### F Hydro

- Dick Schulte, FL

### High Point Juniors

1. David Preusse, IL
2. Conrad Cupitt, LA
3. Todd Wilson, TX

**EXCELLENCE OF PERFORMANCE TROPHY**  
Mike Wilson, TX

**Aloha Cup & Club Trophy**  
Dallas R/C Boat Club



Some model boaters like to let it all hang out but our author, **Paul Schumacher**, believes that, for engine reliability in the heat of competition, you're better off if you

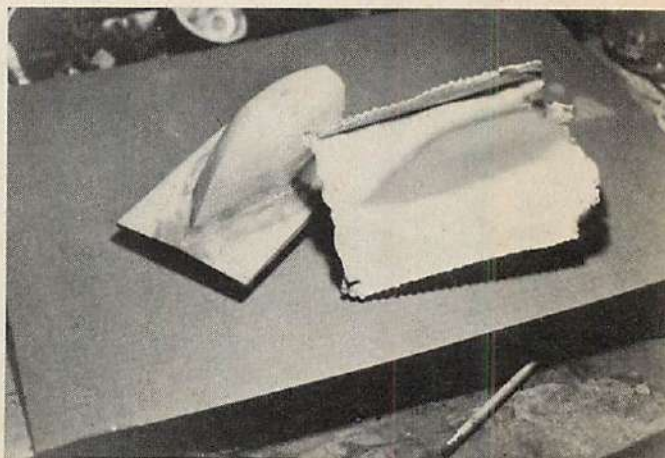
# Cover it up



The first in making your cowling is to have your male plug carved and sanded smooth. The plaster of paris is then applied to the outside and left to set. After



it is removed, it now becomes the female mold for the final step which is the molding of the actual fiberglass part.





If you've ever gone to a boat race and had your big chance at winning a heat go up in smoke because a boat with a big roostertail drowned your engine out, it's time to cover up that engine.

The first thing to do is to measure the engine compartment of that hot boat of yours. Get the length, width and the height of the engine above the deck of the boat. With these measurement in hand go to your local hobby shop and purchase a block of balsa to fit the dimensions. If your shop doesn't have blocks big enough, you can make one by gluing together 1/2"-thick sheets. After this is done, draw the basic outline of your future cowling on the sides and top of the block to give you a carving guide. Keep in mind that this is going to be the male mold for your cowling and make sure that there is sufficient room inside it for your engine.

Now it's time to begin carving. If you want to save a little time, you can cut the excess wood away with a coping saw. Finish the carving by cutting away the unwanted wood with a sharp knife. Again, keep in mind that this is a male mold so don't make any indentations that a female mold could later get stuck on. After the block has been carved into the shape that you want, it must be sanded and painted so that it is extremely smooth.

To make a female mold of your carved block, you'll need either plaster of paris or, if you can get some, the plaster bandages that doctors use for setting limbs. Before applying the plaster to the plug you'll also need a releasing agent to get the pieces apart after the plaster dries. A silicone spray works well for this. Apply the releasing agent to the block of wood until it is completely covered and let it dry overnight. Now apply the plaster of paris or bandages to the block in sufficient quantity to make it about 3/8ths of an inch thick and let that dry over night. The following morning, gentle tapping with your hand should separate the two.

This next step is where you will actually produce the cowling for the boat. You'll need fiberglass mat, not cloth, and polyester resin.

The inside of the female mold (the one made of plaster) must now be coated with

release agent. After it has dried, cut the fiberglass mat into two-inch wide strips and start by painting the inside of the mold with resin. Now place a piece of the mat in place and follow by soaking it with resin again. The next piece of mat should overlap on the edge of the first and so on. Keep doing this until the mold is covered. Let it set overnight to give it a chance to cure all the way through. Again, gentle tapping with your hand should separate the two pieces.

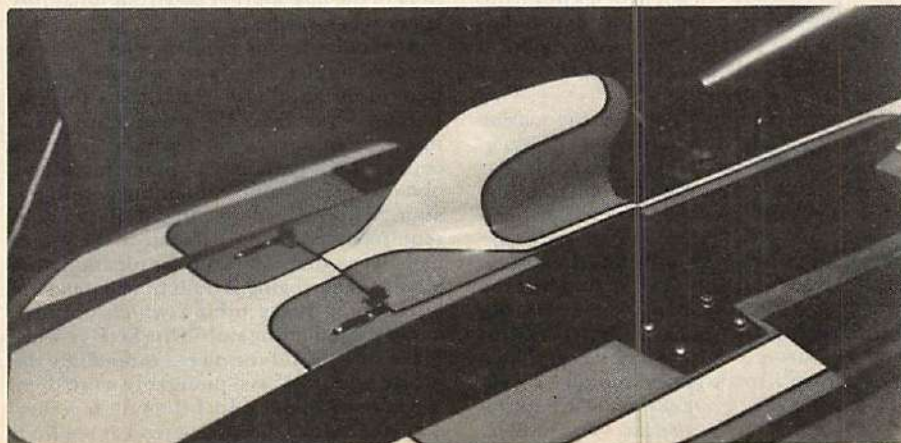
If you now place the cowling in the boat, you'll notice that it falls in the engine compartment. To remedy this you'll have to make a lip around the cowling. This is done by first covering the engine compartment and sides of the boat with Saran Wrap. Then place the cowling in the boat (you may have

to put something under the cowling to keep it from falling into the engine compartment, newspapers work well.). Again, using the fiberglass mat and resin, put strips of mat on the edge of the cowling, overlapping onto the deck of the boat. Let it cure overnight and you are ready for the final finishing. Fill in the holes, if there are any with a fiberglass putty, and sand smooth.

To attach the cowling to your boat you can use hinges, camlocks or dowels. If you are thinking about cutting holes in the cowling to let air in—don't. It is not necessary and the holes will let water in and, after all, keeping water out is why we built it in the first place. Remember, sometimes covering it up is better than letting it all hang out in boat racing.



The final fiberglass mat and resin part is shown (above) being fitted to the deck with hinges. The final result (below) painted to match the boat is both good looking and very practical in the water.



#### List of materials

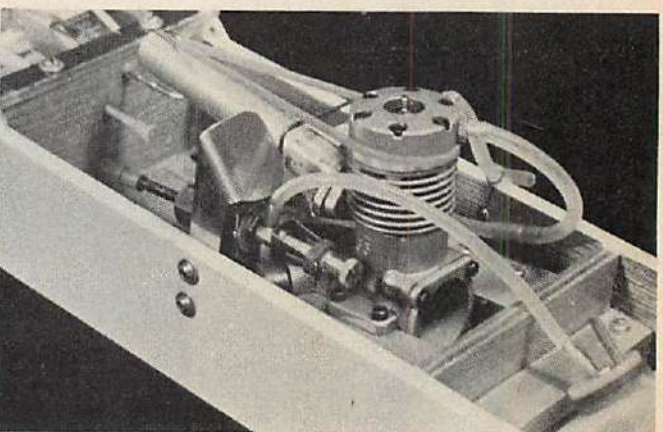
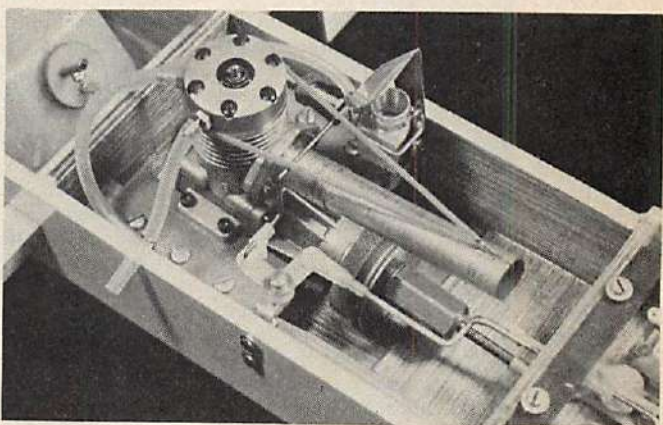
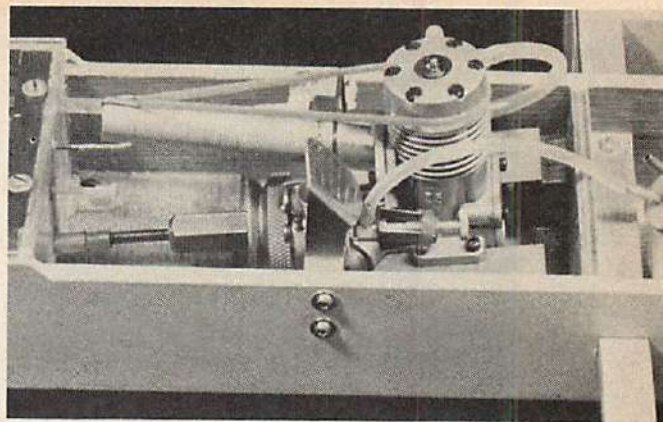
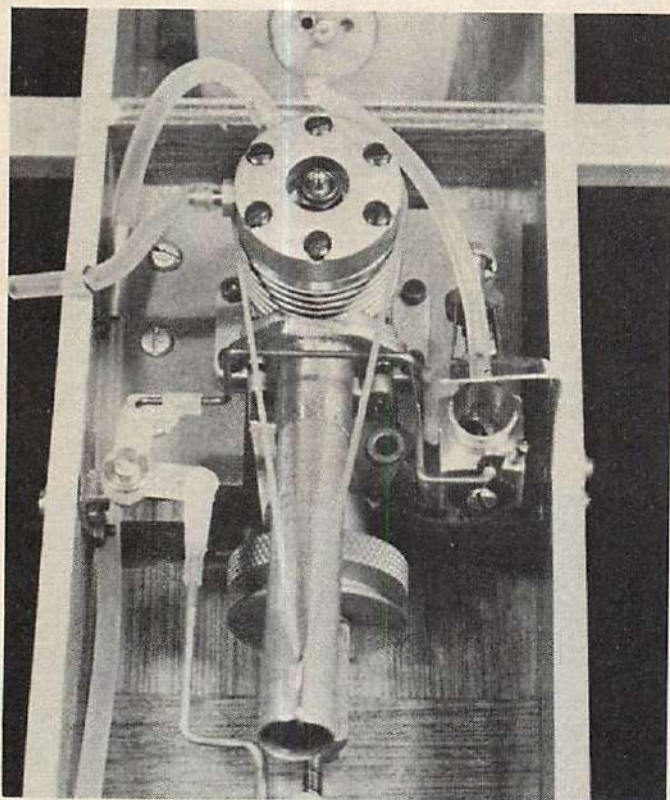
Block of soft balsa  
Plaster of paris  
Sharp carving knife  
Fiberglass mat  
Polyester resin  
Release agent  
Wet or Dry sandpaper



# Bolt-on accessories for K&B's 3.5

Here are some thoughts and some hardware to help improve the power and sea-worthy reliability of this popular engine/**Bob Staat**

PHOTOGRAPHY: BOB STAAT



Here are four views of the pipe, linkage, carb elbow and air intake protector on K&B's 3.5cc engine. All accessories are easy to make.

The recent introduction of many excellent 3.5 cc racing engines has lead to a resurgence of the 20-class boats. K&B's 3.5 was the first of these new-generation schnuerle-ported powerhouses and today, nearly two years after it's introduction, it still is among the leaders as judged by either sales or competitive records.

The K&B is unique because the marine version is not just a water cooled edition of the standard R/C model. The R/C model has a front intake-rear exhaust configuration. The rear exhaust presents problems to boaters because, without the muffler, gases are forced "up stream." If you rotate the case so that the exhaust points aft, you find that the muffler or exhaust stack and the carburetor occupy the same space which is against Mother Nature's laws of physics. Thus, K&B's answer, rotate the carburetor inlet 90° and manufacture a crankshaft with appropriate timing for the marine version. The

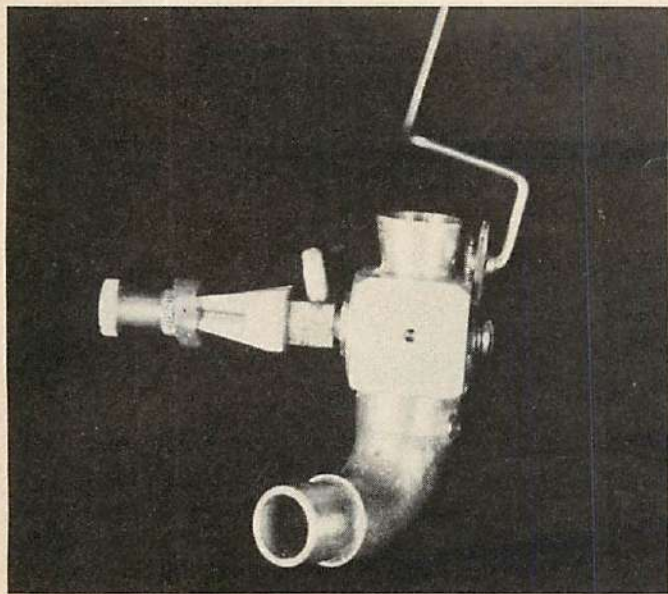
idea works well—except that many of us have found that the side mounted carburetor has a tendency to suck up water from the floor of the boat and cut down our reliability factor when racing.

A solution to this problem that I've seen used several times is to mount the carburetor on an elbow which takes the carburetor away from the exhaust area and places it in an upright position. I used a copper, high-pressure 3/8" plumbing elbow obtainable from air conditioning or refrigeration shops. To mount it, a little work is required but nothing elaborate in the way of tools is needed. The stub for mounting the elbow to the engine is built from 3 pieces of telescoping brass tubing which approximates the mounting stub of the K&B venturi. Make sure the tubing pieces extend into the elbow at least 1/8" and preferably more then, if you're satisfied, solder the unit together. Trim the stub to the same length as the K&B

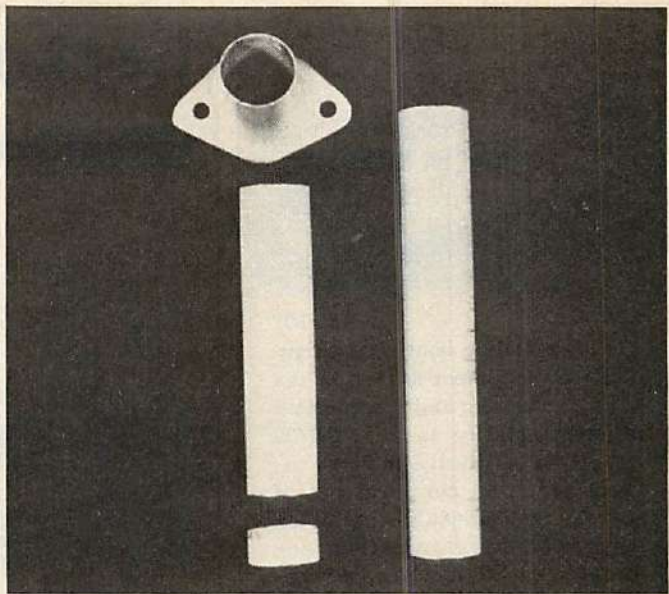
venturi stub. Next, prepare the carburetor mount by skimming the inside of the elbow collar with brass tubing so that the carburetor stub just slips into place and solder. Tap the collar for two 6-32 set screws. I've purposely avoided giving tubing sizes because of variation in elbows and the choice of carburetor. The easiest way to get the right sizes is take your engine, carburetor and copper elbow to the hobby shop and fit the tubing to your parts.

There are a number of carburetors available which will do the job including the stock K&B venturi if the exhaust throttle is retained. I am partial to a carburetor throttle and chose the K&B #4049 unit because of its simplicity and large bore venturi. The suction fuel feed of the 3.5 was improved by reducing the venturi bore to 9/32" (0.281") with two pieces of telescoping brass tubing soldered into the rotating drum (some people get by with a 9/16" venturi or one piece of

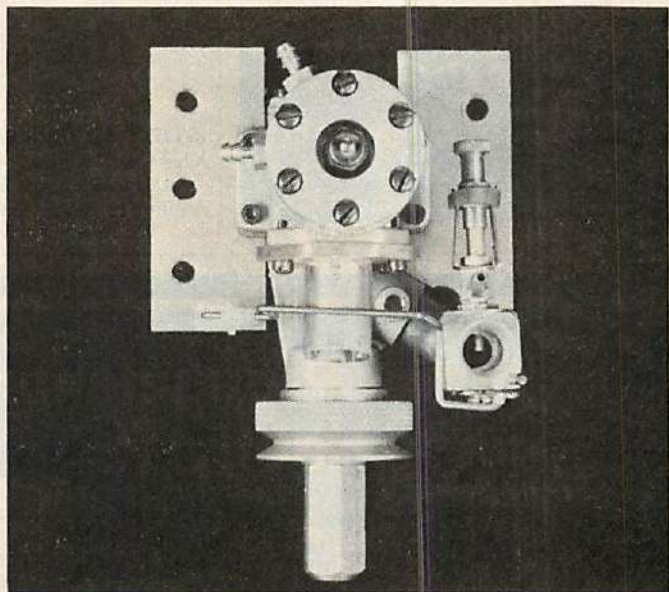
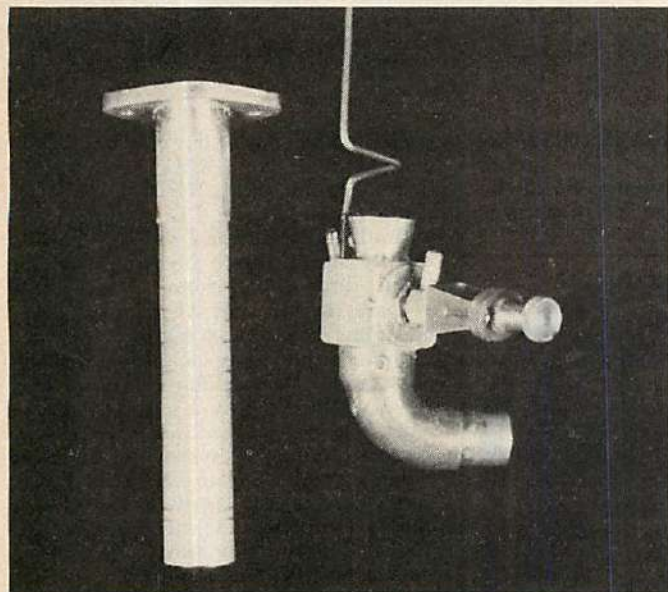




The four pictures on this page will give you a closer view of the make-up of the bolt-on accessories for the K&B 3.5 engine. In boat racing, reliability of



equipment, no matter how fast the boat goes when it's going is very important. A did-not-finish isn't worth anything in a race.



tubing). When everything fits together and you have decided the most convenient needle valve location, apply a thin coat of epoxy resin to the carburetor mounting stub, set it in place then tighten the set screws.

The other "bolt on" feature of my K&B 3.5 is the adaption of a mini-pipe in place of the muffler. My bench tests on the K&B 6.5 (.40) indicate that the pipe included with that engine adds about 500 r.p.m., but more importantly, it seems to shift the power curve towards the higher r.p.m.'s. Tests with my mini-pipe set up on the K&B 3.5 indicate that on a 7x5 prop (cut from a Power Prop 9x5), 50% nitro fuel and the elbow-carburetor I could expect 22,400 r.p.m. with the pipe and 21,900 to 22,000 without the pipe. Not quite up to the 6.5 in absolute r.p.m. but still significant.

Construction of the mini-pipe is quite simple. The mounting plate is  $\frac{1}{8}$ " thick brass or copper with the perimeter cut to match

the exhaust base of the crankcase. The hole for the pipe sleeve is  $\frac{11}{16}$ " in diameter and should be cut at about a  $10^\circ$  angle. The sleeve is a  $\frac{3}{4}$ " long piece of  $\frac{11}{16}$ " o.d. brass tubing (K&S makes this size). Silver solder the sleeve to the mounting plate. Hughey Boats is an excellent source for silver solder. One hint I picked up recently is to dunk the nearly red-hot unit into #30 motor oil. This seems to keep the metal softer and less susceptible to fatigue cracks. The pipe is made from  $\frac{21}{32}$ " o.d. ( $\frac{1}{2}$ " i.d.) brass tubing. An "S" hook into the pipe end and a rubber band around the engine head holds the pipe in place. I've tried several lengths and the best performance on my engine was found with a  $\frac{3}{4}$ " length. A 3" pipe holds the r.p.m. about equal to no pipe while a  $2\frac{1}{2}$ " pipe held the engine back 2000 r.p.m. without the muffler. For final tuning you might try short tubing inserts to vary the length rather than cutting a number of full length pipes.

On the water, a 4-500 r.p.m. increase is difficult to detect without a timed course, but I feel my boat is running stronger with the pipe. I'm sure the mini-pipe set up on Gary Pruesse's K&B 3.5 powered Hustler had something to do with his 67+ m.p.h. runs this summer at the time trials. A properly tuned mini-pipe is well worth the effort.

Final details of my K&B 3.5 improvements include a rather awkward, but functional, set of linkage for the throttle using a  $90^\circ$  bellcrank from the airplane parts section. Also I've come to appreciate the mass of a steel flywheel compared to the aluminum types. The smooth transfer of energy to the boat shaft lets you pull more prop with power. One final detail that doesn't add anything to the speed of the boat but is extremely important is the water shield over the carburetor. I cut mine from  $\frac{1}{32}$ " brass sheet and bolted it to the hull—worth its weight in gold for reliability. ☐



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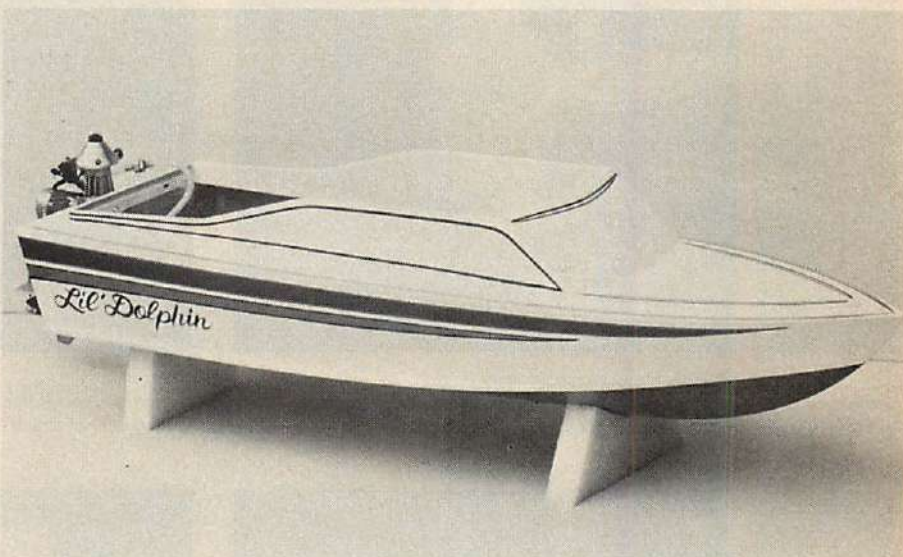
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## Letter Rip!



STEVE MUCK'S R/C BOATS, 6003 Daven Oaks Dr., Dallas, TX 75248, has just released a new boat kit designed for the beginner in model boating. The boat can be

made into any one of three different motor configurations: K&B 3.5CC Outboard, in-board engines up to 3.5CC and electric motor systems. The Lil' Dolphin kit comes with all bulkheads and sheeting made of quality aircraft birch plywood. All bulkheads, deck shears, cabin sides and radio box are pre-cut out. Also included is a plexiglass radio box lid, screws and turn fin. Building instructions include step by step photographs and building hints. Length is 28½", width is 9½" and uses a 2 Channel radio. The inboard hardware kit No. 63 uses a cable stern drive system. All parts are stainless steel, using an adjustable strut for better control. The hardware kit also includes Motor mount, cable engine coupling, cable assembly, rudder, rudder arm, stuffing box and teflon liner.

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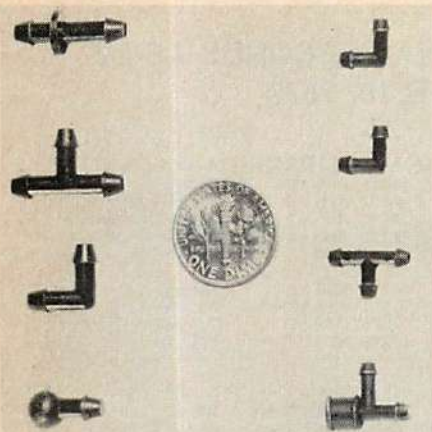
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ROBART, 203 East Illinois Ave., St. Charles, IL 60174, has just released their new Water tight output bushings for R/C model boat radio boxes. These bushings will provide you with a means of obtaining a water-tight linear motion from your servo to the outside of your radio box. They will eliminate side thrust and misalignment due to servo output rotation. There is a minimum amount of drag and, with water proof plumbers grease in the grease grooves, no water will enter and radio box. Available at your hobby shop, two bushings for \$2.49.





**FOURMOST RACING PRODUCTS, 4040 24th Ave., Forest Grove, OR 97116** has just introduced a new large size Fuel Fitting Set. Following the successful introduction of out 1/16 ID. Fuel Fittings, the large size fittings feature double the flow rate with a bore size of 3/32 in. diameter. The set includes an elbow, tee, union and plug. These fittings are molded from lightweight and fuelproof polyethylene. Price per set of four: \$1.50.



**J.C. PRODUCTS, 6229 S. Fife, Tacoma, WA. 98404** is presently offering a plastic box for installing onboard radio equipment in models requiring waterproof boxes. The box features a lid with a 1/2" lip that forms a seal when pressed upon the box. A variety of model marine seals can be used for exiting push rods and the on/off switch through the box. A set of instructions with illustrations is provided to assist in the installation of radio equipment. Retail price is \$12.95 for the box and lid. Please add \$1.50 to cover handling and shipping costs. Dealer inquiries are invited.



**WORLD ENGINES, 8960 Rossash Ave., Cincinnati, OH 45236**, has just announced the availability of the new O.S. .45 Marine RV R/C engine. This is a dykes ringed engine designed to compete in the .47 limited class. The engine comes complete with a marine water-cooled head, flywheel and u/joint.

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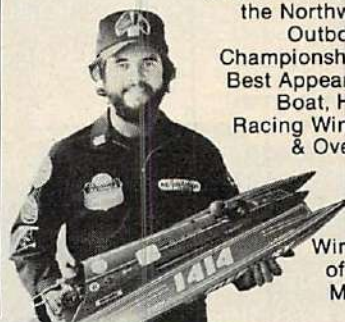
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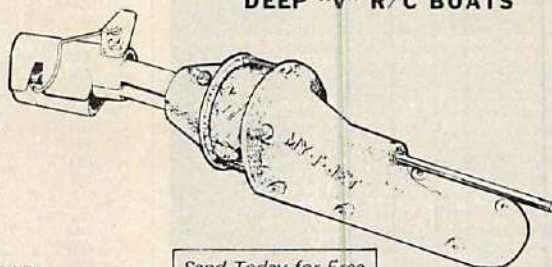


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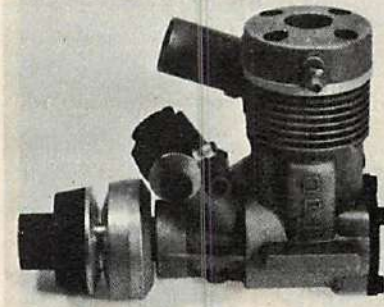
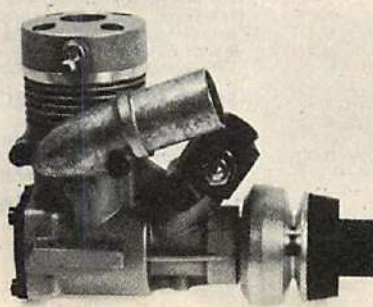
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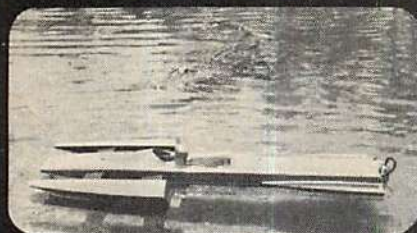
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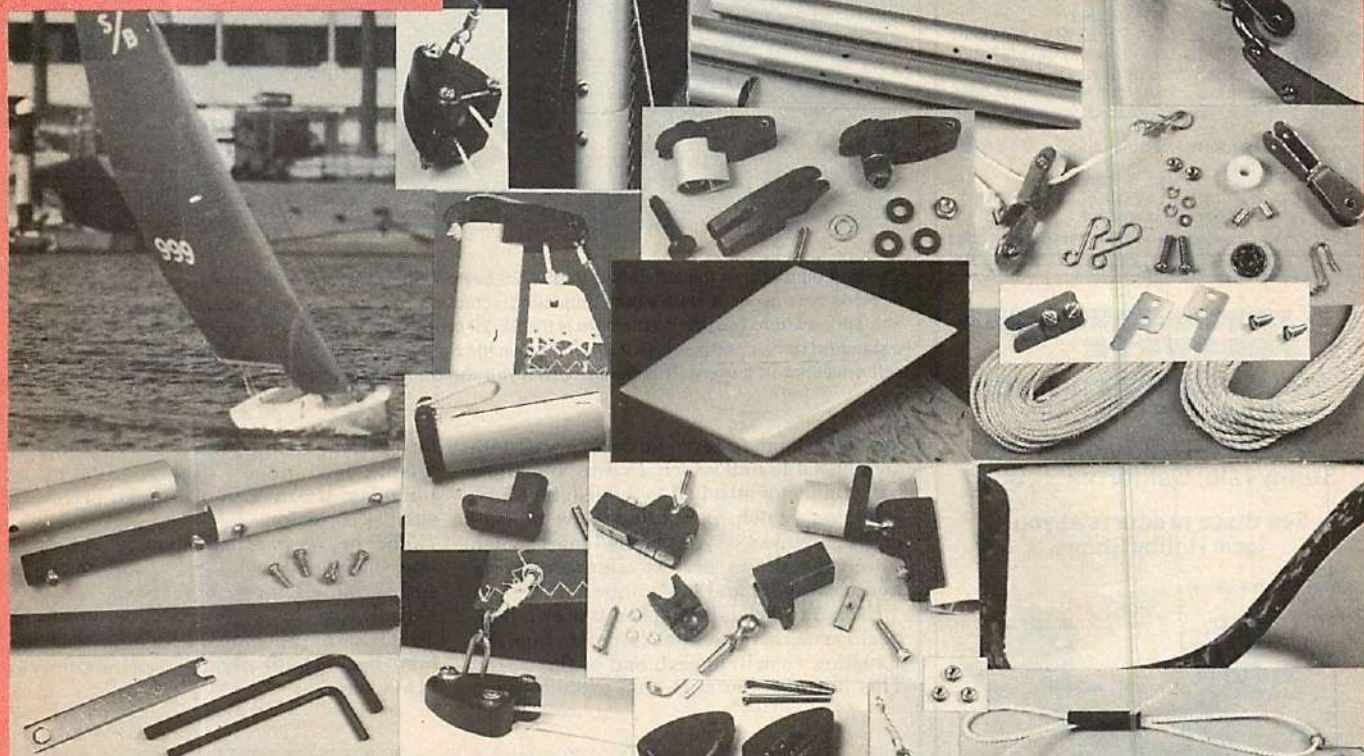
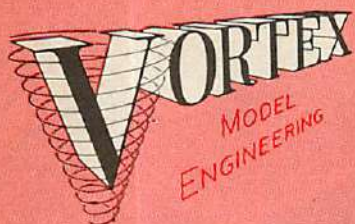
CLASS NAME	YR.	CLUB	SEC.	M.P.H.	ENGINE	HULL	PROP
<b>1/16 MILE STRAIGHT-A-WAY</b>							
<b>HYDRO</b>							
AH	77	GCMB	3.50	64.89	K&B 3.5	Hughey 20 Rigger JG 3.5	
BH	77	FURT	2.91	77.31	K&B 6.5	Thunder Gator OCT.	
CH	73	SMYC	2.94	76.50	OPS 60	Boats by Fisher	
XH	77	FURT	2.72	82.72	Twin K&B	Thunder Gator OCT.2	
<b>MONO</b>							
AM	77	SMYC	5.09	44.20	K&B 3.5	Northwind II F 25	
BM	76	SMYC	4.36	51.61	K&B 40	Northwind OCT 1945	
CM	77	MMSC	3.97	56.78	OPS 60	Northwind RT 3	
XM*	77	SMYC	4.32	52.08	ST 71	Northwind 1950	
<b>DEEP VEE</b>							
ADV	77	SMYC	5.12	43.95	K&B 2.1	Scheff JG 3.27	
BDV	77	NWSV	4.32	52.14	MOD.OPS 40	Wardcraft Form.V	
CDV	77	NWSV	4.56	49.39	OPS ST 60	Wardcraft Form.V	
<b>OUTBOARD DEEP VEE</b>							
AQBDV	77	PSMBC	7.60	29.59	K&B 2.1	Dunlap V JG 22	
<b>OUTBOARD HYDRO</b>							
AQDB	77	SMYC	5.56	40.47	K&B 3.5	Boats by Fisher JG F25	
<b>SCALE HYDRO</b>							
CSH	77	SMYC	3.52	63.92	OPS 60	Scratch 16.67	
<b>ELECTRIC POWERED</b>							
EM	77	NC	15.51	14.50	Aristo Elec 12V	Dumas 1-25	
FM	76	NC	10.93	20.58		Dumas 20	
<b>HYDRO</b>							
AH	77	SMYC	1:28.3		K&B 3.5	Boats by Fisher 3.30	
BH	77	SMYC	1:21.9		K&B 6.5	Boats by Fisher 1462	
CH	77	MM	1:13.4		CPS 60	Wing Ding OCT 1465	
XH	77	SMYC	1:26.4		ST 71	Boats by Fisher 1470	
<b>MONO</b>							
AM	77	SMYC	1:39.7		K&B 21	Northwind JG F 25	
BM	76	SMYC	1:31.1		K&B 65	Northwind JG H 27	
CM	75	SMYC	1:25.5		ST 71	Northwind JG 1-70	
XM	75	SMYC	1:46.5		ST 71	Northwind JG 1.27X	
<b>DEEP VEE</b>							
ADV	77	SMYC	1:54.0		K&B 21	Scheff JG H 27	
BDV	77	SMYC	1:43.5		K&B 6.5	Wardcraft JG 3-22	
CDV	77	HNRA	1:54.9		OPS 60	Form V JG 3-22	
<b>OUTBOARD DEEP VEE</b>							
AQBDV	77	LRCB	2:22.8		K&B 3.5	Dumas JG 20-3	
<b>OUTBOARD HYDRO</b>							
AQBH	77	SFMB	1:57.6		K&B 21	Mongoose JG C-7	
<b>OUTBOARD MONO</b>							
AQBM	77	TT	2:24.0		K&B 3.5	Northwind JG E-20	
<b>SCALE HYDRO</b>							
CSH	77	SMYC	1:37.6		OPS 60	Scratch 2.4	
<b>HALF-HOUR</b>							
A	74	AMPBA	9.60	64			
B	75	WRCMBC	10.81	73	K&B 40	Own Design	
C	71	BD	9.75		ST 61	Flying Flapjack	
X	72	PSMBC	9.00	60	OS 40	Swordsmen	
<b>HOURLY ENDURO</b>							
A	74	LVMB	16.95	113	Veco 20 1/2	Hughey Hydro	
B	74	DMC	18.90	125	ST 40	Kusinda	
C	72	YBC	19.20	128			
X	72	PSMBC	17.85	110	OS 80	Swordsmen	
<b>TWO HOUR ENDURO</b>							
A	71	BD	30.00		Veco 19	Foamy	
B	73	PSMBC	34.50	230	K&B 40	Dow's Hobby Spec.	
C	72	SCMPBA	24.90	166	Taipan 61	Swordsmen	
X	72	PSMBC	3.20	208	OS 80	Swordsmen	
<b>FOUR HOUR ENDURO</b>							
A	71	BD	60		Vedo 19	Foamy	
B	73	PSMBC	66.15	441	K&B 40	Dow's Hobby Spec.	
C	72	SCMPBYA	55.50	370	Taipan 61	Swordsmen	
X	72	SFMYC	57.90	386			
<b>100 LAP TEAM MARATHON</b>							
BM	75		49 Min. 52 Sec.		OPS 40	Wing Ding	

**RICK'S JEWELRY REPAIR & MFG., 1220 Ocean Beach Hwy. #6, Longview WA. 98632** is now offering a 3-bladed metal prop for use on .21 size model boats. This prop, designated the 3-20 has been extensively tested on .21 inboard deep vees, .21 outboard tunnels and vees. The 3-20 is an investment casting using an alloy of beryllium copper. Jerry Dunlap has used the 3-20 with

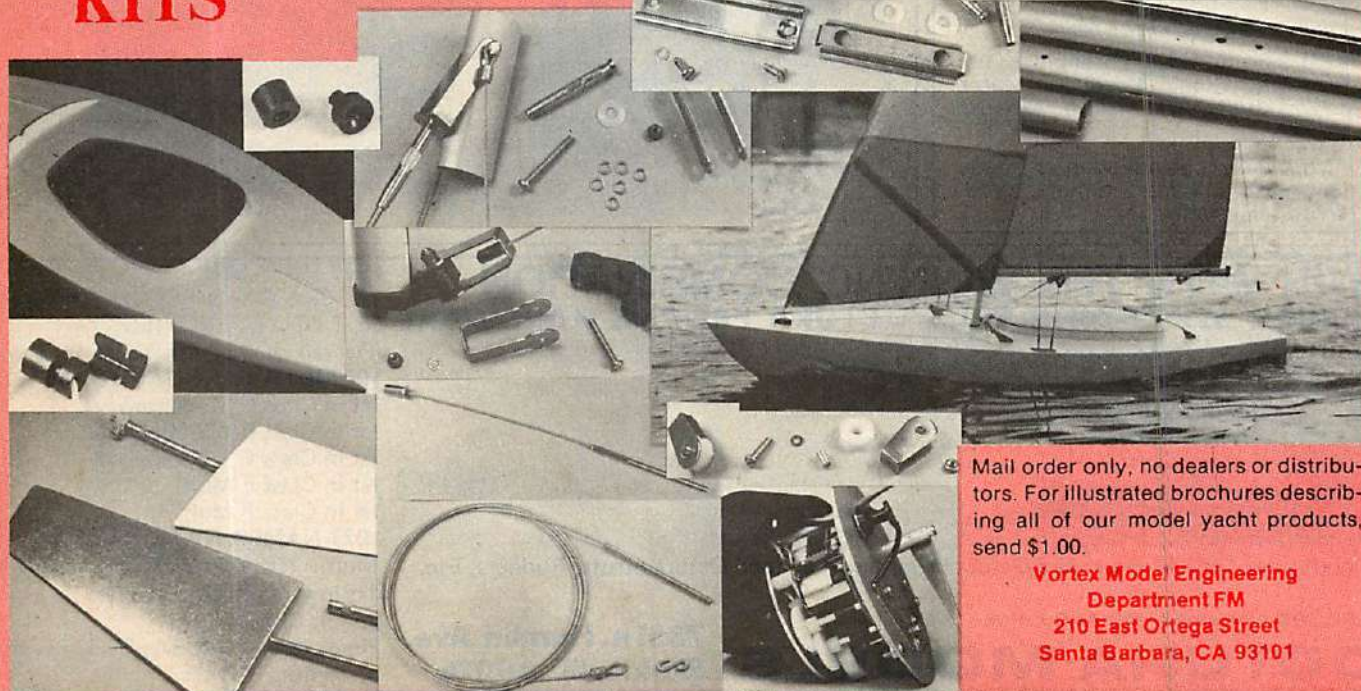
excellent results on his record holding .21 outboard deep vee. Retail price is \$6.95. Please add \$.75 to cover handling and shipping. Dealer inquiries gladly accepted.

**SAIL ENGINEERING, P.O. Box 8439, Richmond, VA 23226**, is now offering their high-power sail actuator in a switch-controlled model for use with standard ser-





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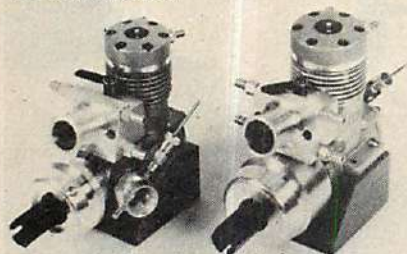
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K&B 3.5 with adapter.



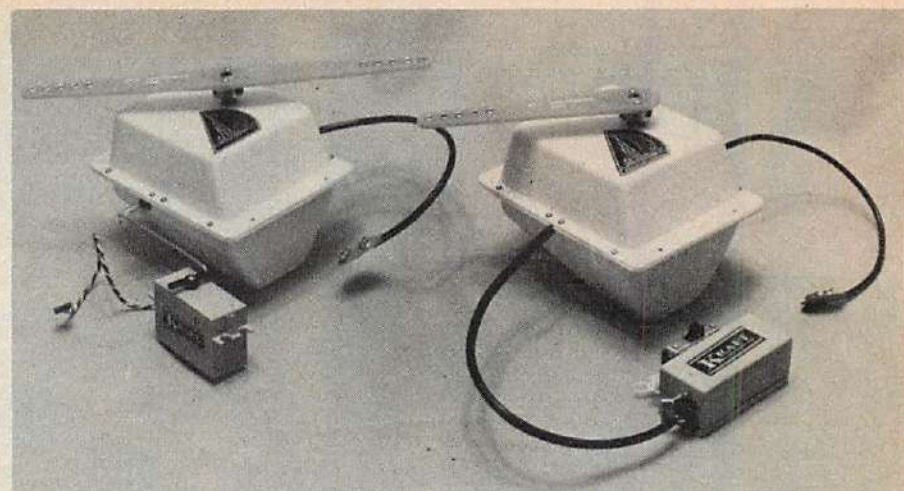
K&B 6.5 with adapter.



International Products Adapter.

K&B 3.5 and K&B 6.5 engines, using International Products' water cooled butterfly throttle exhaust adapter.

Also, water cooled adapter made for most engines manufactured. Write for information.



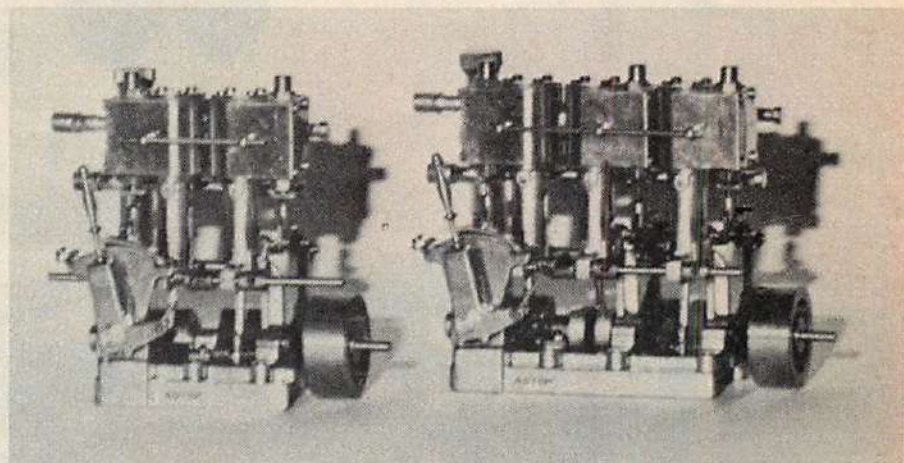
The unit pictured on the left shows the SE-2S switch type sail control attached to the standard model airplane type servo. It shows the connecting actuating rod and the ball link assembly attached to the actuating switch. The unit on the right is the SE-2P proportional sail control which is shown plugged into a standard radio control receiver. The cable on the right hand side of each of these models is for the 12.5 volt drive circuit battery. This feature gives you the tremendous power of 80 inch-pounds of torque.

vos. The standard servo pushrod mates with an adjustable end which, in turn, fits into a ball connector attached to the feather touch actuating switch, permitting movement of the high power servo. The ball joint switch connector allows perfect alignment, very free movement and low torque.

Each Sail Engineering servo uses a high quality snap action switch (separate from the actuation switch) at each end of the travel. This prevents the sails from extending too

far or from being pulled in too tight. All wiring is done on high quality epoxy fiberglass board with plating for protection against corrosion.

The heavy die-cast metal gearbox contains hardened metal gears; and on the 2S and 3S models, the first gear on the motor is a helical gear, integral with the motor shaft. This feature prevents the high power servo from backing off under an extraordinarily heavy wind.



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These engines will come completely equipped with boilers and burners and will retail at \$219.95 for the 2 cylinder and \$299.95 for the 3 cylinder.

#### Engine reviews

I enjoyed reading Bob Staat's article on the OPS 3.5 engine. Since I am involved in competition the results of such tests are of great interest. I would like to suggest that these tests be carried a little further to get more useful information.

Since the engine is tested under set conditions and basic performance figures are recorded, why not see what happens with different (available) fuels, different lengths and types of tuned pipes, glow plugs, carbs and throttles?

Bob Staat or FM might not like to come right out and say they which they think is the better engine, fuel, etc., but if he records all the test data accurately then the readers can draw their own conclusions.

Personally, I am not too excited about internal dimensions and port sizes but I would be curious to see how the temperature and humidity effect performance or what the idle characteristics are. Other points to consider would be vibration, fuel consumption (mentioned in the OS Max .65 test) and list price. After all, the automotive magazines publish road tests in every issue.

DOUG FACONI  
Ringwood, NJ

#### R/C submarines

May I first compliment you on your fine magazine, it's article are timely and very interesting. I am in the planning stages of building an R/C submarine. The problem is that I can't seem to find much information on them. Subs of the US Fleet, U-boat and Otsu classes are my obsession. If you would

FLYING MODELS

be so kind as to print my letter in your mag maybe some of your more knowledgeable readers in the field could contact and help me.

GEORGE WARD JR.  
936 South 55th St.  
Philadelphia, PA 19143

#### Great Lake freighter

I read a piece in the May 1976 issue of FLYING MODELS about Henry Pickands Great Lake freighters. I am very interested in building one preferring the Reserve or Cason J. Callaway or the ice breaker Mackinaw. How can I contact Mt. Pickands?

BRIAN ANTEN  
2828 English Rd  
Rochester, NY 14616

© Sorry Brian but we don't have Mr. Pickand's address but maybe he will read this letter and contact you —Ed.

#### Which is the best?

I have a number of questions concerning model boats which I hope you can help me with. I would like to purchase a .40 size Deep Vee. I understand that the Dumas DV-40CF, the Ruff Stuff 40 by 3-D Models and the Formula V of Wardcraft Marine are

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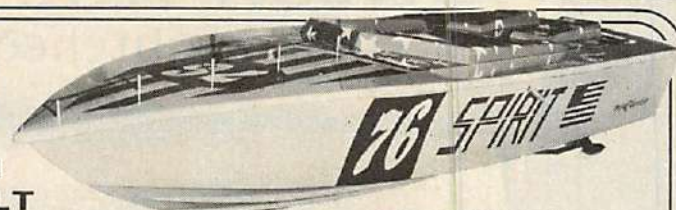
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among the best available. Regardless of price, which of these three would be best for me? I am looking for a boat with a somewhat scale appearance, but the potential for performance would be the key factor. I also want to purchase a .40 marine engine. Which one would you recommend?

JEFF HOLIDAY  
Deerfield, Mass.

©All three of the hulls that you mention have, as you put it, the "potential for performance" and all are capable of winning boat races. As to which of the many fine hulls on the market would be best for you, we suggest that you read the Dry Dock Reviews in FLYING MODELS and visit some clubs in your area and see who's winning with what, keeping in mind the amount of experience that the individual who wins any given race has had in model boating.

A properly designed hull is a major factor in winning boat races but so is engine reliability, radio reliability and experience on the part of the builder and driver of the boat—Ed.

#### More info

In the two years I have had my subscription I cannot recall but once or twice that a detailed report was given to the installation of the stern drive units or props.

I realize different hulls and conditions require different set-ups, but I wish you could give a generalization for a specific hull and powerplant each month.

In general this is what I would like to know: the best type of prop drives and rudder for a certain hull and most of all, the angle, depth, size, offset, prop type, balance

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point of hull, and mounting point for the stern units. Not how to construct the hull or install the engine.

JAMES D. NIELSON  
Mitchell, Neb.

I enjoyed the June 1977 FLYING MODELS very much, especially the section entitled boats at Wrams. I would very much like to contact Bud Lederer the builder of the S-10 Schnellboot. I have a special interest in Schnellboots and would like to share some knowledge with Mr. Lederer.

STEVEN S. NICHIPOR  
Bath, NY

#### IMPBA Roostertail

As of this writing, November 1977, winter is here in the Midwest and the model boating season is coming to a close. Yesterday, the Indy Model Boat Club sponsored the first outboard race in the Midwest. The race turned out to be a real success with John Ackerman winning with a hull produced by Herb Steuart. He put the boat together in three hours. Theresa Dufloth finished top honors for the women and little David Hughey won the junior division. It was a fun race to watch, with the course being M shaped. That shape was a real equalizer between the hydros, tunnels and monos. Something to consider.

I would like to take this opportunity to thank all of the outgoing district directors for their participation and support of the IMPBA. It is through their support that this organization can operate. I would also like to ask them for their continued help and effort.

The results of the elections are in with

some very surprising results. District IV and V each had an election which determined their director by one vote. Fred McBroom is the new director for District IV and Glen Cupit for district V. Tony Maas and Gene Taylor should also be congratulated for the close race and should feel good since the close vote is a reflection of their capabilities. Both Tony and Gene are presently considering invitations to be assistant directors which I hope they will both accept. Ron Walker is the new District II director and it should be pointed out that he received 57% of the vote with four people running for the position. Stan Smith, Bill Brown and Joel Horak were all within a few votes of each other for the runner-up position. The other district directors are as follows: District I, Ron Witt; District III, Dave Field; District VI, Howard Smith; District VII Mike Wilson (1977 Overall National Champion); District IX, Charles Pottol; and District X, Howard Hole. I am hoping to publish the entire list with addresses and newly appointed assistant directors in next month's Roostertail. I would like to congratulate all of those who ran for office and all of you who voted. I was still disappointed in the total number of people who voted and I am compiling a list of those people who did vote. The next time one of you has a gripe, I will check to see if you voted.

I have some feedback from Martin Davis and Bill LeFeber who most recently went to a NAMBA contest in Phoenix. Their reaction to that race was very similar to the one I had after attending a race in Fresno. They indicated that the race was great and that model boaters are the same all over the country no matter which organization they

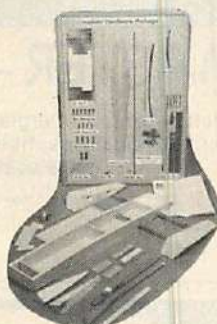


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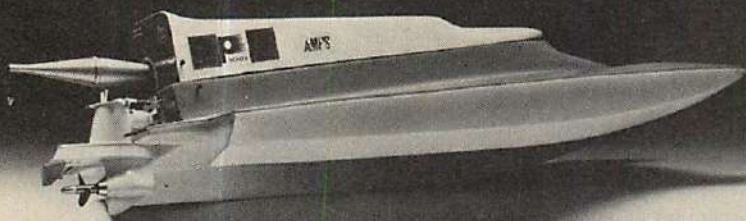
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belong to. They thought that there was a warm feeling about being able to race together again, a feeling I agree with and will do everything to promote. It has been unfortunate that the actions of a minor group of people can be so strong as to prevent good communications and harmony. We are all aware of our differences and hope that we can learn to live with some of them and eliminate others. Once again, I think it is up to the model boaters to put pressure on our leaderships to eliminate these differences and to work together to help model boating to grow.

On October 29 and 30, I attended the Chicago R/C exhibition. I would like to thank all of those people who helped in the IMPBA booth, especially Gene and Carol Klisnick who put in a great deal of time and effort. Thanks! The show was a great success with a good number of boats on display. A large number of scale boats were also in attendance. A model boating demonstration was given on both days and it gave the rest of the radio control community the opportunity to see what model boating was all about.

As you read this, the holiday season will just have ended and I hope that you all had a very happy one—LEONARD SKWIERA, President IMPBA.

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1/8 x 3/8	.20	1/8 x 3	1.21	1/8 x 4	.71	3 x 3	1.16	3 x 3	4.62	2 x 6	8.97
1/8 x 1/2	.24	3/16 x 3	1.48	3/16 x 4	.79	1/2 x 4	.55	1 x 4	2.66	3 x 6	13.60
1/8 x 3/4	.34	1/4 x 3	1.74	1/4 x 4	.93	3/4 x 4	.63	2 x 4	4.16		
1/8 x 1	.39	3/8 x 3	2.20	3/8 x 4	1.18	1 x 4	.70	3 x 4	6.10	C-GRAIN AAA 8-12 LBS.	
3/16 x 3/16	.16	1/16 x 4	1.32	SHEETS 36" Lengths		1-1/2 x 4	.88	1 x 6	6.10	1/32 x 2	.50
3/16 x 1/4	.19	3/32 x 4	1.49	1/32 x 2	.44	2 x 4	1.07	2 x 6	6.10	1/16 x 2	.56
3/16 x 3/8	.22	1/8 x 4	1.70	1/16 x 2	.51	3 x 4	1.54	3 x 6	9.00	3/32 x 2	.62
3/16 x 1/2	.27	3/16 x 4	1.96	3/32 x 2	.56	1/2 x 6	.79			1/8 x 2	.68
3/16 x 3/4	.36	1/4 x 4	2.32	1/8 x 2	.63	3/4 x 6	.92	AIRFOILED SHAPED SHEETS		3/16 x 2	.85
1/4 x 1/4	.23	3/8 x 4	2.98	3/16 x 2	.80	1 x 6	1.07	3/16 x 3 x 36	1.24	1/4 x 2	1.07
1/4 x 3/8	.28	1/16 x 6	2.45	1/4 x 2	1.02	1-1/2 x 6	1.33	1/4 x 3 x 36	1.40	3/8 x 2	1.16
1/4 x 1/2	.31	3/32 x 6	2.60	3/8 x 2	1.10	2 x 6	1.50	1/4 x 4 x 36	1.90	1/32 x 3	.65
1/4 x 3/4	.44	1/8 x 6	2.84	1/2 x 2	.61	3 x 6	2.32			3/32 x 3	.85
1/4 x 1	.55	3/16 x 6	3.20	1/32 x 3	.64			BLOCKS 12" Lengths		1/8 x 3	.98
5/16 x 5/16	.27	1/4 x 6	3.82	1/20 x 3	.61			1/2 x 2	.55	3/16 x 3	1.21
5/16 x 3/8	.36	3/8 x 6	4.40	1/16 x 3	.66			3/4 x 2	.70	1/4 x 3	1.33
5/16 x 1/2	.41			3/32 x 3	.79	1 x 1	.42	1 x 2	.55	3/8 x 3	1.71
5/16 x 5/8	.51	ROUNDED EDGE		1/8 x 3	.93	1/2 x 2	.55	3/16 x 3/4	.40		
5/16 x 1	.60	AILERON & ELEVATOR STOCK		5/32 x 3	1.05	3/4 x 2	.70	1/4 x 1	.51	VH - VERY HARD	
3/8 x 3/8	.41			3/16 x 3	1.16	1 x 2	.82	5/16 x 1-1/4	.63	1/16 x 3	.72
3/8 x 1/2	.47	1/4 x 1	.70	1/4 x 3	1.28	1-1/2 x 2	.92	3/8 x 1-1/2	.72	3/32 x 3	.85
3/8 x 3/4	.54	3/8 x 1	.82	5/16 x 3	1.49	2 x 2	1.07			1/8 x 3	.98
3/8 x 1	.65	1/4 x 2	.95	3/8 x 3	1.65	1/2 x 3	.68	18" BALSA ASSORTMENT		3/16 x 3	1.21
1/2 x 1/2	.52	3/8 x 2	1.08	1/32 x 4	.98	3/4 x 3	.86	Box	7.50	1/4 x 3	1.32
1/2 x 3/4	.70			1/16 x 4	1.16	1 x 3	1.07	BULK BALSA - 3" x 36"		3/8 x 3	1.71
1/2 x 1	.87			3/32 x 4	1.21	1-1/2 x 3	1.28				
5/8 x 5/8	.64			1/8 x 4	1.40	2 x 3	1.53				
5/8 x 1	.94			3/16 x 4	1.57	3 x 3	2.31				
3/4 x 3/4	.88	LEADING EDGE		1/4 x 4	1.84	1/2 x 4	1.07				
3/4 x 1	1.00	36" Lengths		3/8 x 4	2.37	3/4 x 4	1.23				
		1/2 x 3/8	.54	1/16 x 6	1.94	1 x 4	1.45	Not Stamped or Sorted			
		3/4 x 5/8	.82	3/32 x 6	2.15	1-1/2 x 4	1.72	Sold Only in Standard Packs		CONTEST BALSA	
		1 x 3/4	1.10	1/8 x 6	2.37	2 x 4	2.07	Standard Packs in ( )		4 - 6 Lb. Stock	
				3/16 x 6	2.50	3 x 4	3.06	Price Shown List Per Sheet		Very Light	
				1/4 x 6	3.15	1/2 x 6	1.48	1/32 x 3	(25) .47	1/32 x 3	.72
				3/8 x 6	3.70	3/4 x 6	1.72	3/32 x 3	(20) .59	1/16 x 3	.77
						1 x 6	2.03	1/8 x 3	(15) .69	1/8 x 3	1.03
						1-1/2 x 6	2.61	3/16 x 3	(10) .84	3/16 x 3	1.27
						2 x 6	3.05	1/4 x 3	(10) 1.04	1/4 x 3	1.39
						3 x 6	4.52	3/8 x 3	(10) 1.28	3/8 x 3	1.71



Dan Osoda (Manato, MN) had the highest score of all senior contestants in CL Scale at the 1977 Nats and was placed 2nd in the Open event, thereby being selected as a member of the U.S. Team for the 1978 World Scale Championships. He flew a CL conversion of the Sig RC Zlin Akrobat 526AS kit. Dan's model is the 526A, details for which are shown on the kit 3-View. Mike Gretz's Special Canopy for this version is available for \$3.25 from Sig (White ABS Framing is \$2.95 additional).



### Dan Osdoba's Zlin In Flight At The Riverside, CA Nationals

The Zlin has a spectacular contest record. Here are some of the major placings: 1st - 1969 RC Scale Nationals, 4th - 1969 RC Scale World Championships by Maxey Hester; 4th - 1974 CL Scale World Championship, 1st - 1975 CL Scale Nationals, 5th - 1976 CL Scale World Championships, 1st - 1976 CL Scale Nationals, 1976 Nationals Sterling Award and CL Flight Achievement Award, 1st - 1977 Sport Scale GSLMA by Mike Gretz and 2nd - 1974 RC Scale Nationals by Larry Smith.

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